CQ

August 1971
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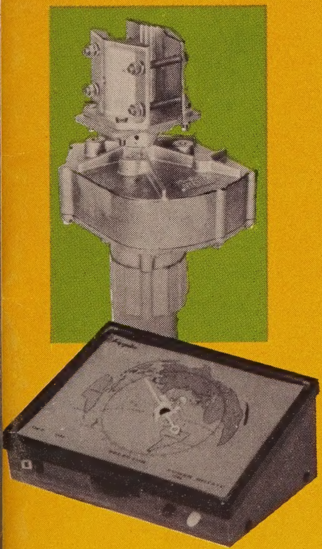
World Wide DX Contest Phone Results... Page 35

CQ Tests The Hy Gain Roto Brake



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The Radio Amateur's Journal

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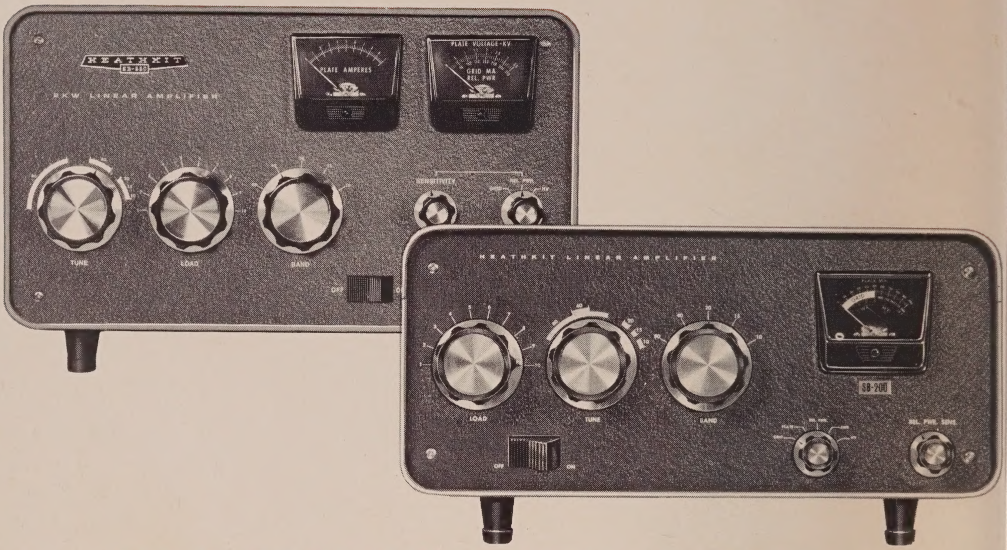

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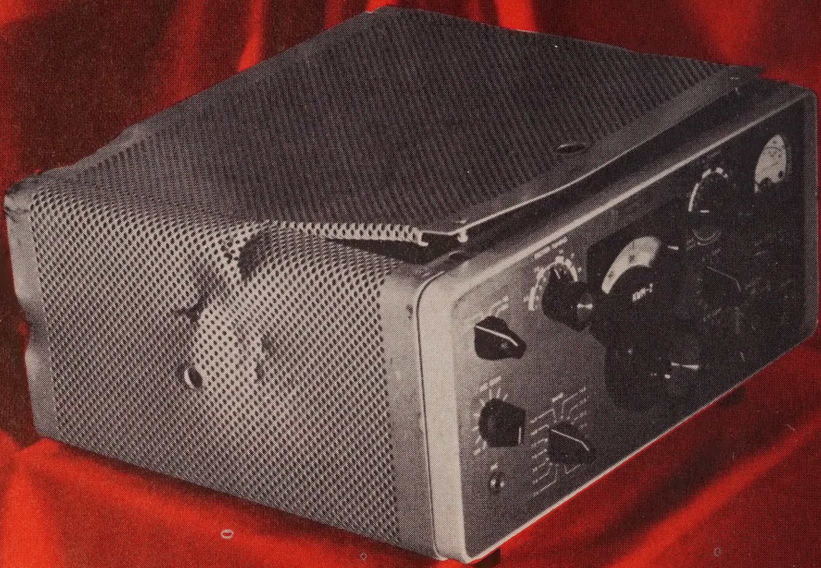

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AUGUST, 1971 VOL. 27, NO. 8

The Radio Amateur's Journal

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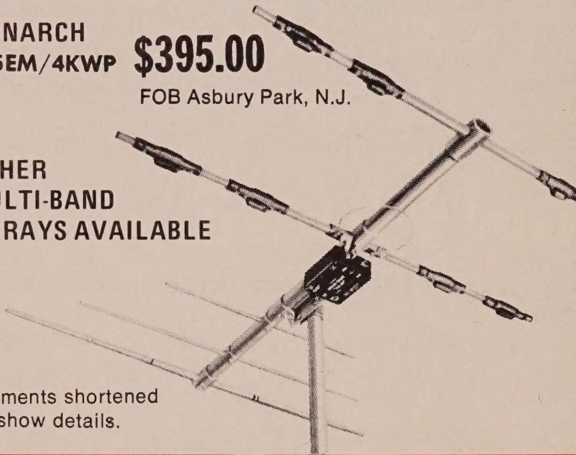

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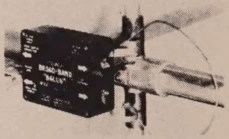

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OUR READERS SAY

Contests

Editor, *CQ:*

I am writing in response to Hal Pottorf's letter in June 1971 *CQ*.

To begin with, I am sorry for Mr. Pottorf if he is not able to find operating space during a contest. The imposition is not intentional, however. Furthermore, I have heard ample non-contest frequencies, especially at the top ends, during nearly every major contest I have entered. Patience and a modest amount of operating acumen should allow Mr. Pottorf to alleviate much of his problem. Of those occasions when there really is no room, I can only say "Too bad." Should I discourage others from driving to and from work because the freeway jams, not the fault of any individual, inconveniences me? Certainly not; the roads and our bands are there for everyone to use to his own ends, within the law. Second, the value of contests may not be apparent to Mr. Pottorf, but the value exists nonetheless. Many state-of-the-art innovations have been popularized and many construction practices have been improved, largely because they afford the station performance and reliability which are more essential to contesting than quite a few other activities. As for aiding international relations, the Brazilians must enjoy contesting with us, as they go gung-ho each WPX Contest to spur more activity. And who does not enjoy a 100-an-hour JA pile-up? Obviously the JA's don't mind it.

Finally, it is true that contests are increasing in number, but only because increasing numbers of hams, foreign as well as domestic, are eagerly joining the ranks of contesters. People, not just magazines, make contests work. To the contest organizers: thanks and keep them coming.

Marty Woll, WB6VZI
Pres., UCLA ARC
Granada Hills, Ca.

F.M. Versus S.S.B.

Editor, *CQ:*

The comparison of f.m. and s.s.b. in Fred Brown's "An Introduction to VHF FM" can be misleading if one does not evaluate the systems compared in the reference stated (Richardson, Eness and Dronsuth). The discrepancy between the test system and typical amateur equipment lies in the receiver passband used for s.s.b. The noise power detected through the 4.5 kc i.f. passband would be 2 db greater than that through a more typical 2.75 kc i.f., or 3 db greater than a 2.1 kc passband which is practical and commonly used. Therefore the advantages of s.s.b. over f.m. as amateurs use them is probably greater than the 1-2 db stated in the article. Admittedly there are other factors which make s.s.b. less desirable, particularly for mobile communication, but I feel that figures as well as experience justify s.s.b. over f.m. for long range v.h.f. work.

Tom Bishop, K0TLM
Kansas City, Mo.

The following is W6HPH's reply to reader Bishop's comments.

Editor, *CQ:*

I appreciate Tom Bishop's comments on my article where I made reference to an experiment which showed s.s.b. only 1 or 2 db better than f.m. Whatever the validity of the experiment, I cannot agree that a s.s.b. receiver passband of 4.5 kc will be significantly worse than one of 2.7 kc with regard to weak-signal readibility. It's true that a noise meter would indicate 2.2 db more noise from the 4.5 kc passband, but the ear, fortunately, is a more sophisticated contrivance than a noise meter. It more closely resembles an instantaneous spectrum analyzer.

Let us compare a 2.7 kc and a 4.5 kc rectangular passband, assuming, in both cases, that the b.f.o. is properly positioned about 300 c.p.s. from the edge of the passband. The 2.7 kc passband, after it is down-converted to audio by the receiver's product detector will then give rise to a noise spectrum from 300 to 3000 c.p.s. The 4.5 kc passband will give rise to a spectrum from 300 to 4800 c.p.s. or the same noise as the 2.7 kc passband plus additional noise between 3000 and 4800 c.p.s. So we see that the only difference between the two passbands is noise at audio frequencies above 3000 c.p.s. And since hearing experiments have shown that noise in one part of the audio spectrum, unless it is very loud, does not affect perception of signals in a different part of the spectrum, noise between 3000 and 4800 c.p.s. will not affect readability of speech in the frequency range of 300 to 3000 c.p.s. This can be demonstrated very easily with a variable-bandwidth receiver. So long as the audio image remains adequately suppressed there is no deterioration of weak-signal s.s.b. readability when the bandwidth is increased, assuming, of course, no QRM. It is this spectrum-analyzer nature of the human ear, incidently, which also explains why audio selectivity does not materially improve readability of weak v.h.f. c.w. signals where the readability threshold is determined by receiver noise rather than QRM.

The experiment referred to in my article was carried out by a competent research team using sophisticated laboratory equipment and accepted for publication in a highly-respected journal. But this by no means suggests that the experimental methods are beyond criticism or that the results must be blindly accepted. One of the basic tenets of science is that all experimental results must be independently confirmed before they can be generally accepted. To my knowledge the results of Messrs. Richardson, Eness and Dronsuth have never been confirmed elsewhere, and this would be a significant and worthwhile research area for the serious amateur.

In favor of f.m. I might also point out that very sophisticated phase-lock detection schemes are now available which are said to be many db better than frequency discriminator detectors.

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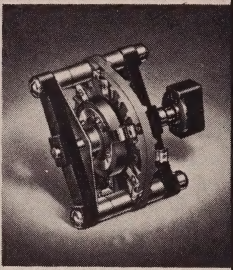

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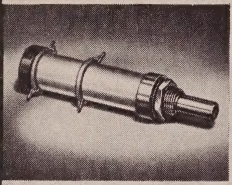

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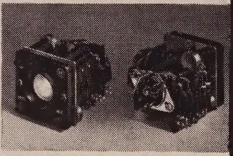

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Fred Brown, W6HPH
Cambridge, England

CB on 220 mc

Editor, *CQ:*

I have been reading with great interest the letters concerning CB on 220 mc. I agree with most of them in that CB should be left where it is, but even so, most of the people failed to realize that even if the FCC did close down 27 mc and moved CB to 220 mc do you honestly believe that the illegal CB'er is going to sell all of his expensive gear for 27 mc, buy new gear for 220 mc, then move up there where there is no skip and only local contacts are possible? I don't think so.

If the FCC is so under-staffed now they can't catch the illegal CB'ers, what makes anyone think they (FCC) will be able to catch them after they close down 27 mc. The illegal CB'ers are going to hang on to what they have. The phrase, "You're going to get caught," just doesn't scare them anymore. They will sit there on 27 mc and talk to their heart's content, regardless of where the FCC has moved CB. I never used to worry about being caught when I was one of those illegal CB'ers.

Mike Ferlisi, WN5CKU/4
Fort Rucker, Al.

Lower Code Speed

Editor, *CQ:*

One of your readers has remarked that he read your Zero Bias with pleasure in regards to your suggestion of lowering the code speed test for Generals and Conditionals—well, I read it with displeasure. Also, you asked if anyone agreed with your answer to K4EVY's letter on reduced code speed—and my answer is no.

Code happens to be the foundation of the wireless radio station and if the General is supposed to have a working knowledge of radio theory, then he had better be prepared to know his code equally well. Ten w.p.m. will put a 15 w.p.m. man asleep, also at 10 w.p.m. the evening is shot by exchanging names, QTH's, RST's, exact location and next is 73 es CUL and that's it.

In no way can you justify lowering the code speed for Generals and still maintain the quality of amateur radio operators that are present today. The world is at the radio operators finger tips on c.w. with a reasonable amount of operating power.

The notation that "I-did-it-and-so-can-they" remark you quoted to K4EVY just doesn't hold water in any bag—that's not the point and you are missing it. The point is if the Novice or Tech doesn't have the drive or will to study a month or so more in order to get from 10 w.p.m. to 13 w.p.m. then he won't have it to better his knowledge of the hobby or to keep his station abreast of science, keep it built well or operate it efficiently and properly.

One man has already stated he may give up and go to CB and that's exactly what the amateurs don't want—another CB frequency and one

[*Continued on page 100*]

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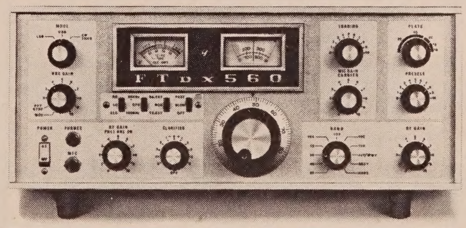

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Announcements

Bellevue, Nebraska

A late arrival from the Bellevue ARC notifies us that they will have a special station on the air (WS0ATA) from June 26 through July 7 in conjunction with the celebration of the 115th anniversary of the founding of the city, the 25th anniversary of the Strategic Air Command (SAC) and the 10th anniversary of "Looking Glass", the SAC flying command post. Frequencies will be approx. 30 kc inside the lower end of the bands for c.w. and 3905, 7265, 14290, and 21355 kc. Foreign stations QSL via Bureau to K0BLT. Domestic stations enclose s.a.s.e. (number 10) to: Chamber of Commerce, Bellevue, Neb. 68005.

"KA Net" Changes Time and Frequency

The Far East Auxiliary Radio League (FEARL) has announced a frequency and time change for the KA Net. Beginning in July, the Net will meet twice each Sunday at 0001 GMT and again at 1200 GMT. The Net frequency will change to 14.300 mc. The Net call will remain, "CQ KA Net." FEARL, sponsor of the "KA Net" is composed of amateur radio licensees assigned to U.S. Forces, Japan.

Reciprocal Operating Privileges With Jamaica

An agreement has been concluded between the Government of Jamaica and the Government of the United States in respect of the reciprocal granting of authorizations to permit licensed amateur radio operators of either country to operate their stations in the other country, in accordance with the provisions of Article 41 of the International Radio Regulations, Geneva, 1959. This agreement entered into force on April 28, 1971.

Greenburg, Pennsylvania

The Foothills Radio club will hold its 4th annual Hamfest on July 11, at Wendel Ball Field, Wendel, Pa., 2.4 miles from the Irwin interchange of the Pa. Turnpike. Plenty of prizes and activities.

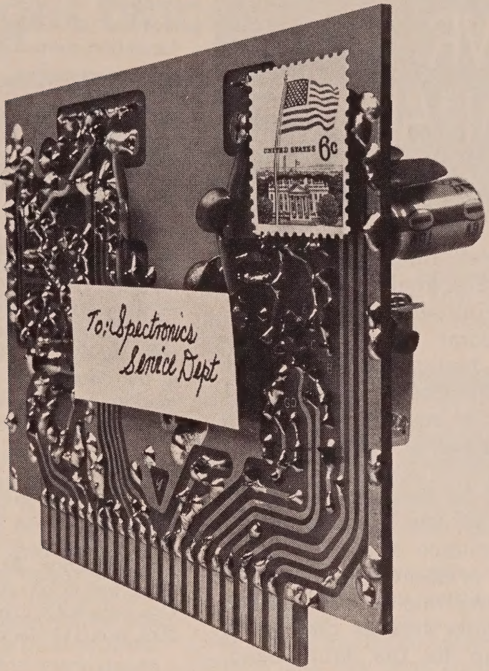
Levelland, Texas

There will be a Swapfest & Picnic, Sunday, Aug. 1, at the City Park in levelland. It is sponsored by the Northwest Texas Emergency Net and the Hockley County ARC. Mobile talk is in 3950 kc and 146.94 or through the Lubbock Repeater on 146.34. Contact John Bell, W5NGX 208 Pat St., Levelland Texas for further details.

Arlington, Texas

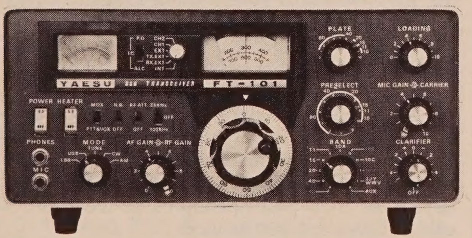
The summer meeting of the Texas VHF-FM Society will be held on Aug. 14 & 15 at the Cibola Inn, U.S. Highway 80 near Collins Ave.,

Repair by mail.



Except for driver and finals, the Yaesu FT-101 is all solid state. Ten FET's, 3 IC's, 31 silicon transistors and 38 silicon diodes do the job — solidly. Most of these components are found on computer-type plug-in modules. Should one of them ever give you trouble, just send us the module. We'll send you a factory-new replacement by return mail.

But with the FT-101, you can expect everything but trouble. Like a built-in VOX, 25 KHz and 100 KHz calibrators, the WWV 10 MHz band, a high Q permeability tuned RF stage and a 5 KHz clarifier. All of that in a portable rig that sounds like it was home base.



The FT-101 is thirty pounds of power. You can work the world on 260 W PEP, 180 W CW or 80 W AM maximum input power. The world between 80 meters and 10 meters. And you'll hear it back with 0.3 microvolts sensitivity — and a 10 db signal-to-noise ratio.

This rig even includes 12 VDC and 117 VAC built-in power supplies right in the package. You supply the 12 or 117 volts plus an antenna and you're air-ready.

For in-motion operation, a noise blanker is essential. We didn't forget to include it in the FT-101. It picks out noise spikes and leaves you with nothing but clean, crisp signal copy.

Though plug-in modules mean quick, convenient repair, we don't really expect to hear from FT-101 owners. Unless it's on the air. Maybe that's why we unconditionally guarantee it for a year. The FT-101 — only $499.95.

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Other Special Features:
Bumper or trunk mounting option . . . Guying device for frequency stability at highway speeds . . . Break-over (hinge) to lower antenna . . . Rotate antenna 360° in the break-over position. A convenience for easy coil insertion, whip adjustments etc. . . . DX Matching Network: Small, simple to install and operate. The real reason why Mosley can Guarantee an adjustable VSWR of 1.5/1 or better.
Free QSO Index with the purchase of a complete "Rode-Master" antenna system. Get all the facts, See your Mosley dealer or write Dept. 206.

Mosley Electronics Inc.
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Arlington, Texas (midway between Dallas and Fort Worth). There will be equipment displays, technical sessions, door prizes and business meetings plus XYL activities. For complete information contact Jack Mason, W5NSQ.

Marshalltown, Iowa

The annual Iowa 75 meter phone net picnic will be held on Sunday, Aug. 15, at Riverview Park in Marshalltown. There will be a swap table, prizes and a pot luck dinner at 12 noon.

West Milford, New Jersey

The Knight Raiders VHF Club, K2DEL, will hold its 5th annual Hamfest at Westbrook Park in West Milford on Aug. 15. There will be displays, contests, flea market, auction and hidden transmitter hunt. Tickets in advance are $2.00; at the door $2.50. For tickets and more information contact Eric Strassler, WA2NLP, 35 Crescent Ave., Passaic, N.J. 07055.

Jackson, Michigan

The Cascades ARS will have its 2nd annual Swap and Shop on July 25, at the Jackson Armory Court, in Jackson. Doors open at 8:00 A.M. Donation: $1.00 in advance, $1.50 at the door. For tickets or further information contact: Cascades ARS, c/o K8SMC, Activities Manager, P.O. Box 512, Jackson, Mi. 49201.

Warren, Ohio

The Warren ARA will have their 14th annual Hamfest Sunday, Aug. 22, at Yankee Lake, on Ohio Rt. 7, five miles north I-80. For details and a map, send a card to: Hamfest, Box 809, Warren, Ohio 44480.

Special Prefix Operation—KQ0NEB

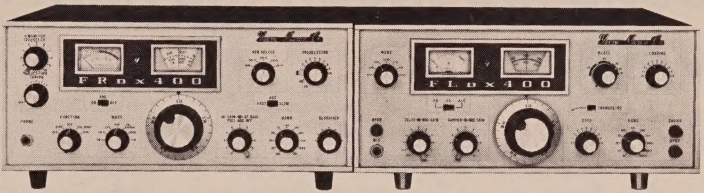
The Lincoln, Nebraska Amateur Radio Club has revealed plans to operate a special events, special prefix amateur radio station in connection with the 1971 Nebraska State Fair in Lincoln. Using the call KQ0NEB, operations will commence at 2100 GMT September 1, 1971 and will be continuous 24 hours a day through 0500 GMT September 9, 1971. Transmitters will be on 10, 15, 20, 40 and 80 meters, both c.w. and s.s.b.

DX contacts will automatically be QSL'ed via Bureaus. Stateside contacts must send cards with s.a.s.e. to W0YOY, Box 5006, Lincoln, Nebraska 68505. As with past operations of the Club, a special QSL card will be used.

Chicago, Ill.

The Chiburban Radio Mobileers announce their 4th annual "160 Meter Reunion", July 25th at Tinley Creek Woods, Grove #1, at 143rd St. and Harlem Ave. (Ill. Rt. #43). There will be many 160 meter activities and 1810 kc will be monitored. For full information contact Barry Boothe, W9UCW.

Now you don't have to pay twice the price to get twice the rig.



Picture this pair in your shack. The Yaesu FLdx 400 transmitter and the FRdx 400 receiver. Loaded with power. Loaded with sensitivity. Loaded with features. Loaded with value. Read on, and discover how you can have the most up-to-date receiver-transmitter rig in the world . . . and at an unbelievably low price.

The FRdx 400 Receiver

Get a big ear on the world with complete amateur band coverage from 160 meters through 2 meters, including WWV and CB reception. Four mechanical filters do it — they provide CW, SSB, AM and FM selectivity. Separate AM-SSB-FM detectors are included, along with squelch and transmit monitor controls. Plus a noise limiter and a variable delay AGC. And a built-in notch filter with front panel adjust for notch depth.

The FRdx includes calibration markers at 100 KHz and 25 KHz, with accurate calibrator checks verified by WWV. A solid-state FET VFO for unshakable stability. And a direct-reading 1 KHz dial affords frequency read-out to less than 200 Hertz.

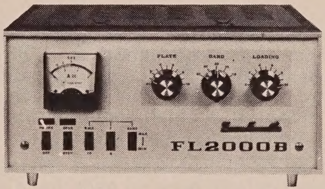
The FRdx 400 sells for $359.95.

The FLdx 400 Transmitter

Here's how to set yourself up with dual receive, transceive or split VFO operation. The FLdx 400 with its companion receiver brings you the ultimate in operational flexibility. Flexibility like frequency spotting, VOX, break-in CW, SSB, AM and even an optional FSK circuit.

The completely self-contained FLdx 400 features a built-in power supply, fully adjustable VOX, a mechanical SSB filter, metered ALC, IC and PO. A completely solid-state FET VFO provides rock-solid frequency stability.

We rate the FLdx 400 very conservatively. That rating guarantees you 240 W PEP input SSB, 120 W CW and 75 W AM. The FSK option will go all day at a continuous 75 W. And you get full frequency coverage on all amateur bands — 80 meters through 10 meters — with an optional provision for certain other bands that you can personally specify. For all that, you pay just $299.95.



FL2000 B Linear Amplifier.

Ideal companion to the Series 400, this hand-crafted linear is another example of Yaesu's unbeatable combination of high quality and low cost. Designed to operate at 1500 watts PEP SSB and 1000 watts CW, this unit provides superb regulation — achieved by a filter system with 28 UF effective capacity.

Other features include dual cooling fans (one for each tube), individual tuned input coils on each band for maximum efficiency and low distortion, and a final amplifier of the grounded grid type using two rugged carbon-plate 572 B tubes. Ready to operate at only $299.95.

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Model MO-1—54″ Mast for Deck or fender mount—Folds at 15″ above base . . . Price: **$11.95**

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Model RM-15	15 meter resonator	8.95
Model RM-20	20 meter resonator	9.95
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Model RM-75	75 meter resonator	13.95
Model RM-80	80 meter resonator	13.95

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Model RM-10S	10 meter resonator	$11.50
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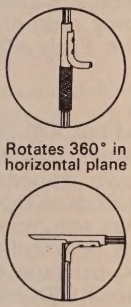
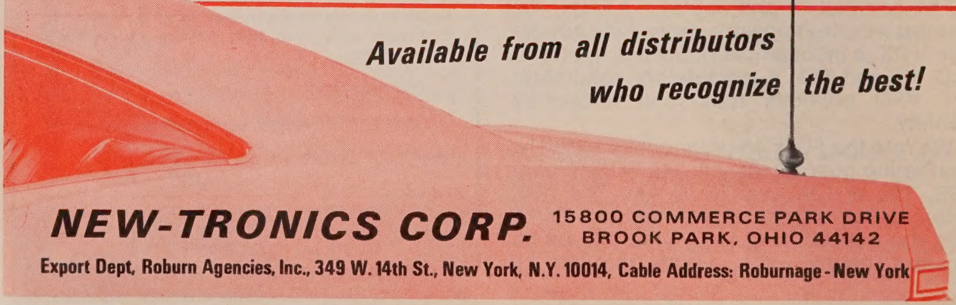
Model RM-75S	75 meter resonator	24.50
Model RM-80S	80 meter resonator	24.50

The original hinge and sleeve clutch mechanism.



Rotates 360° in horizontal plane



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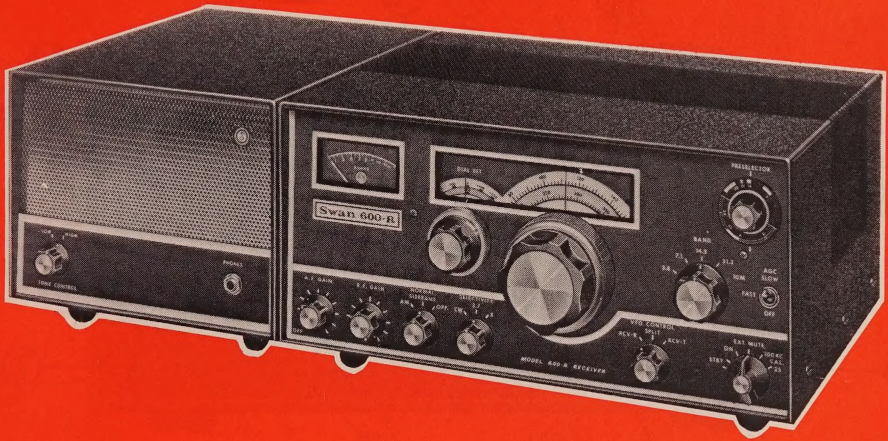

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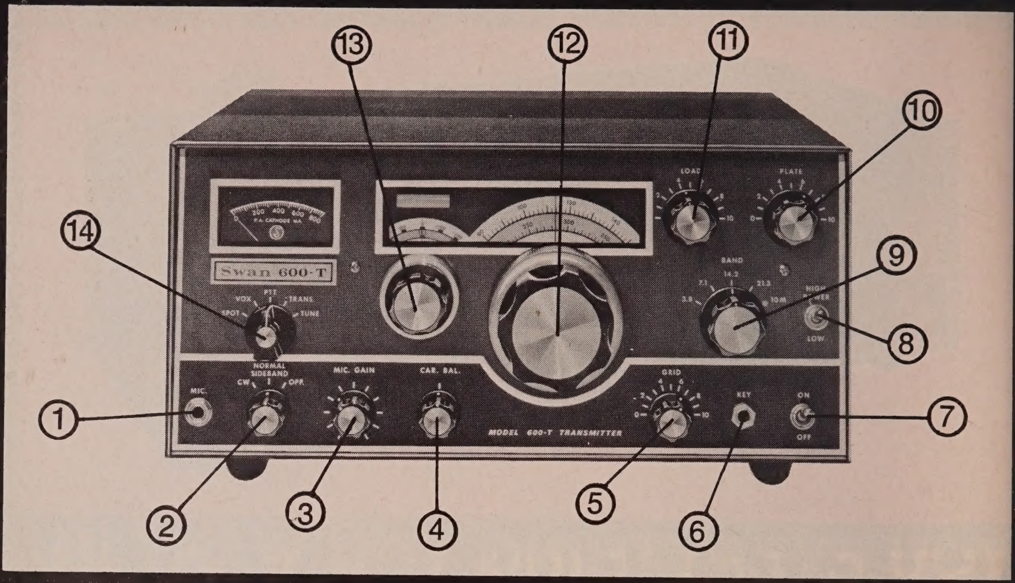
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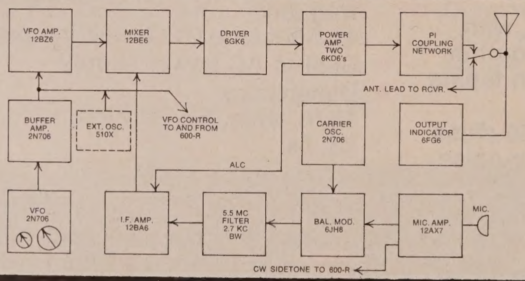
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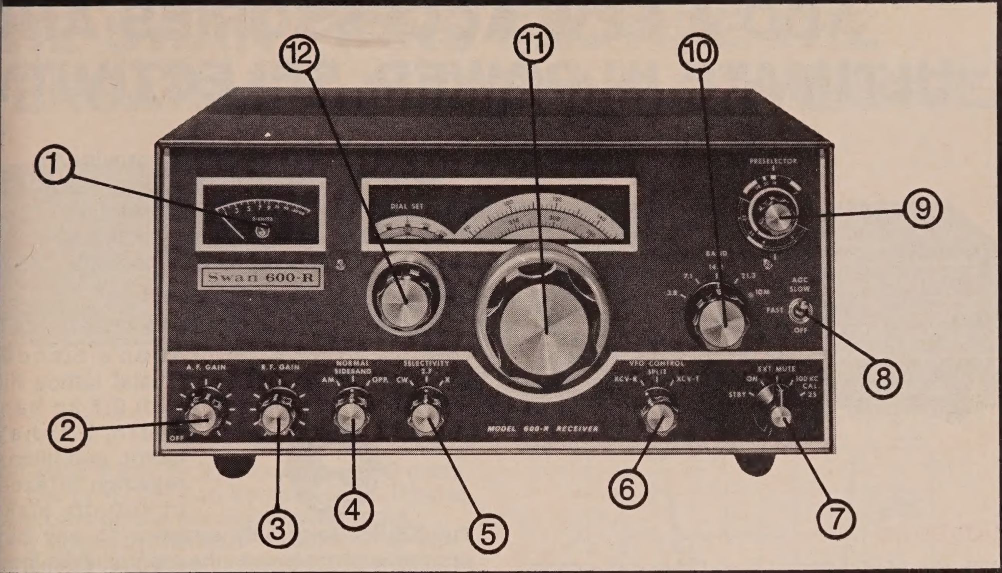

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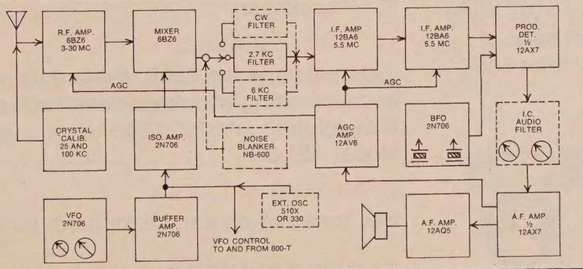
6. VFO selector: allows separate control of receiver and transmitter frequencies on their own VFO, transceive on the Receiver VFO, or transceive on the Transmitter VFO.
7. Function Switch: Standby/On/External muting/100 kc calibrator/25 kc calibrator.
8. AGC selector: fast attack/ fast release if you desire, fast attack/slow release, or AGC off.
9. Preselector tuning: 6:1 vernier tuning, 3 to 30 mc, with calibrated dial scale.
10. Band selector: selects the proper tuned circuits for operation on 5 frequency bands.
11. The smoothest tuning system on any rig: this large knob and dial give unsurpassed feel. With 2 kc calibration on the lower bands, frequency readout to 500 cps is a breeze. On the 10 meter band, dial calibration is in 5 kc increments.
12. Dial set control: selects 200 kc segments of the 80, 40, 20 and 15 meter bands. On 10 meters, selection is in 500 kc segments.



R.F. AMP. 6BZ6 3-30 MC
MIXER 6BZ6
CW FILTER
2.7 KC FILTER
6 KC FILTER
I.F. AMP 12BA6 5.5 MC
I.F. AMP. 12BA6 5.5 MC
PROD. DET. ½ 12AX7
AGC
AGC
CRYSTAL CALIB. 25 AND 100 KC
ISO. AMP. 2N706
NOISE BLANKER NB-600
AGC AMP. 12AV6
BFO 2N706
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VFO 2N706
BUFFER AMP. 2N706
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VFO CONTROL TO AND FROM 600-T
A.F. AMP. 12AQ5
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BLOCK DIAGRAM, 600-R RECEIVER

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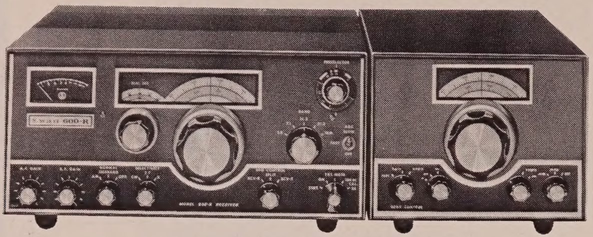
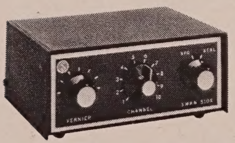
ADD A FEW ACCESSORIES AND
ULTIMATE IN POWER, SELECTIVITY,



MODEL 330

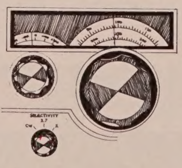
With the Model 330 external tuner, the 600R becomes a general coverage receiver with 3 to 30 mc coverage (except for an I.F. guard band between 5.4 and 5.6 mc). Amateur band coverage with the internal VFO is retained. The 330 is switched in or out with a front panel control. The 330 may also be used to extend the coverage of the 600T to the limits of its tuned circuits, permitting transmission on most MARS and many commercial frequencies. No crystals to buy. The Model 330 plugs directly into a socket provided on back of the 600R.

MODEL 510X



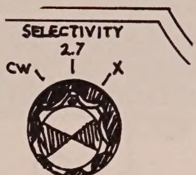
With the Model 510X crystal oscillator accessory, the 600R can be crystal controlled on any frequency within its range for extremely stable operation on MARS or commercial service. A vernier control permits adjustment to exact frequency. A panel control provides instant selection of VFO tuning or crystal control. The 510X plugs directly into a socket provided on back of the 600R. It may also be used with the 600T for similar applications.

TUNING SYSTEM



The lower bands, 80 through 15 meters, are covered in 200 kc segments. 10 meters is covered in 500 kc segments. 100 kc and 25 kc crystal calibrator markers provide for highly accurate frequency readout on a large, easy-to-interpret dial. Ultra smooth vernier tuning with large knobs gives you the incomparable feel of a Swan tuning system.

I.F. SELECTIVITY



Swan's standard crystal lattice filter with 2.7 kc bandwidth, 1.7 shape factor, and ultimate rejection in excess of 100 db, makes the 600R's selectivity superior to any other production receiver on the market. With installation of the optional 16 pole crystal lattice filter (SS-16B), the 600R offers selectivity that far exceeds any receiver, at any price, anywhere! Selectivity then becomes truly incredible, with a shape factor of 1.28 and ultimate rejection exceeding 140 db. Two additional crystal lattice filter options are available: one is a narrow band CW filter; the other is a broad band AM filter. There are provisions in the 600R for the installation of up to 3 filters, with front panel selection.

600 CPS filter	$20.00*
6 kc filter	$22.00*
SS-16B super selective 2.7 kc bandwidth	$75.00*

A.F. SELECTIVITY

Audio response of the 600R is 300 to 3000 cycles, ±3 db, with 3 watts output to a 4 ohm external speaker. Headphone jack is provided with the speaker accessory unit.

An optional IC Audio Filter accessory is available for internal installation in the 600R. It provides a choice of either notching or peaking a selected audio frequency, greatly enhances both phone and CW reception.

ICAF accessory $44.00*

I.F. NOISE BLANKER

Installs inside the 600R. Extremely effective in suppressing impulse noises such as auto ignition interference.

Model NB-600 .... $79.00*

STANDARD SPEAKER

Has tone switch and headphone jack. $18.00*

DELUXE SPEAKER

Includes Swan phone patch, tone switch, and headphone jack $59.00*

*Factory price

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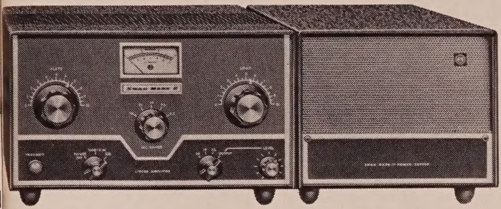


MARK II LINEAR AMPLIFIER

2000 watts P.E.P. in SSB mode or 1000 watts AM, CW or RTTY. Two Eimac 3-500Z Triodes easily provide the full legal power input. Easily driven by the 600T transmitter, or any exciter having between 100 and 300 watts output. Provides full frequency coverage of the amateur bands from 10 through 80 meters, and MARS frequencies.

Planetary vernier drives on both plate and loading controls provide precise and velvet-smooth tuning of the amplifier. Greatly reduced blower noise is provided by a low RPM, high volume fan.

MATCHING POWER SUPPLY

A separate, matching unit which may be placed beside the MARK II or with its 4½-foot connecting cable, may be placed on the floor. Component quality is of the highest caliber. Silicon rectifiers deliver 2500 volts D.C. in excess of 1.2 amperes. Computer grade electrolytic filters provide 40 mfd capacity for excellent dynamic regulation. A quiet running fan allows continuous operation with minimum temperature rise, extending the life and reliability of all components.

Mark II, complete with tubes and matching power supply **$599.00***

MODEL VX2

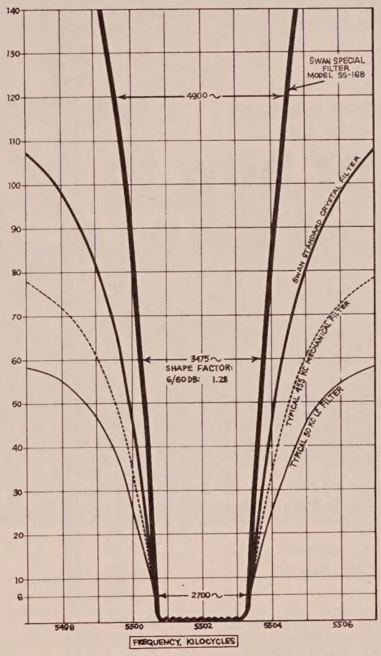
Provides voice-operated transmit control or semi break-in CW operation.

Plugs directly into 600T **$29.00***

*Factory price

WHAT'S THE SECRET OF SWAN'S FAMOUS SUPERIOR AUDIO QUALITY?

Bandwidth is what determines the audio frequency range you can transmit and receive through the filter. The wider the passband, the wider the range of audio frequencies. It becomes necessary to choose a proper compromise between a narrow bandwidth to help reduce QRM and a wide bandwidth which will provide more natural sounding voice. We have found that 2.7 kc is the ultimate compromise between natural sounding voice quality and best rejection to QRM.



Another factor is skirt selectivity, which is determined by the shape factor of the filter. Because of Swan's industry leading 1.7 to 1 shape factor, rejection of adjacent frequency QRM is maximum.

Ultimate rejection is the third factor, and a vital measure as to how good the filter performs. The accompanying graph illustrates the effectiveness of the Swan filter when compared with LC or mechanical filters used in competitive receivers.

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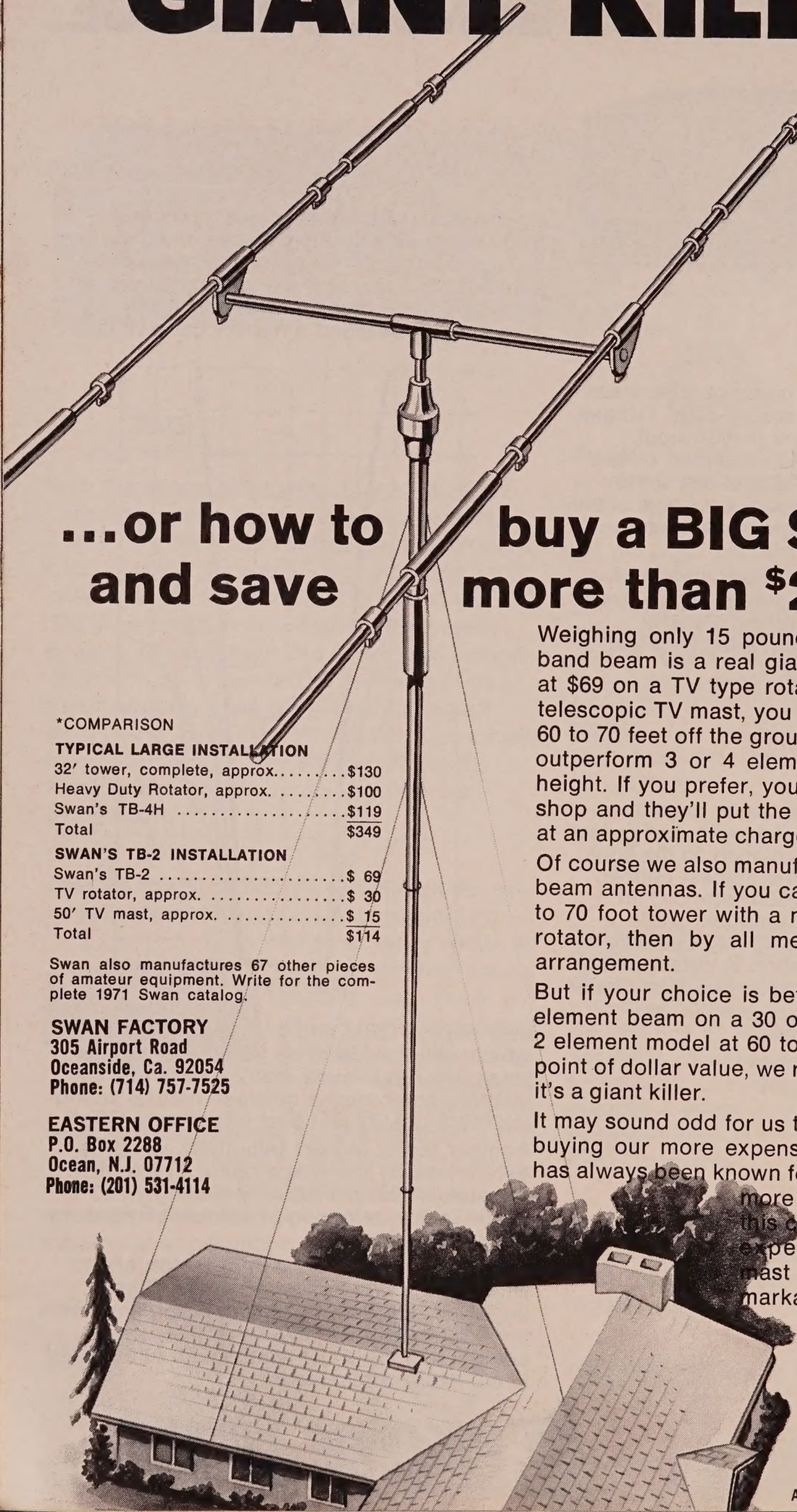

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...or how to buy a BIG SIGNAL and save more than $200*

Weighing only 15 pounds, the Swan TB-2 tri-band beam is a real giant killer. With the TB-2 at $69 on a TV type rotator for $30, and a $15 telescopic TV mast, you can easily get the TB-2 60 to 70 feet off the ground. At that height it will outperform 3 or 4 element beams at a lesser height. If you prefer, you can call your local TV shop and they'll put the whole thing up for you at an approximate charge of $30 to $40.

Of course we also manufacture 3 and 4 element beam antennas. If you can mount these on a 60 to 70 foot tower with a more costly heavy duty rotator, then by all means this is the ideal arrangement.

But if your choice is between putting a 3 or 4 element beam on a 30 or 40 foot tower, or the 2 element model at 60 to 70 foot, from a standpoint of dollar value, we recommend the TB-2... it's a giant killer.

It may sound odd for us to be talking you out of buying our more expensive models, but Swan has always been known for giving the radio ham more value for his dollar. In this case, the TB-2 on an inexpensive telescopic TV mast and rotator is a remarkable value.

*COMPARISON

TYPICAL LARGE INSTALLATION	
32′ tower, complete, approx.	$130
Heavy Duty Rotator, approx.	$100
Swan's TB-4H	$119
Total	$349
SWAN'S TB-2 INSTALLATION	
Swan's TB-2	$ 69
TV rotator, approx.	$ 30
50′ TV mast, approx.	$ 15
Total	$114

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An Analytical Approach To Mixer Spurious Evaluation

BY JACK PEROLO,* PY1PE1C

Determining the frequencies and levels of spurious signals before a piece of equipment is even built can help the builder avoid potentially dangerous conversion schemes. An earlier CQ article described a useful technique for mixer spurious frequency analysis. This article tells how to improve the accuracy of the technique by mathematical means.

IN a previous article[1] a very helpful and practical method was described to determine the spurious frequencies generated in a mixer stage: the order (and consequently the approximate magnitude) of a spurious for a certain v.f.o.-i.f. mixing scheme could be calculated together with the spurious frequencies generated by the mixing. By so doing, the best v.f.o.-i.f. frequency combination can be determined at design time and this procedure pays off when a receiver or any other mixing scheme leaves the drawing board and enters actual lab testing.

I have used the method extensively as reported elsewhere[2] and I give it unconditional credit for keeping me out of trouble on different occasions.

The method, as described by Lee is basically a graphical one. It can be handled differently, however, if one is willing to use mathematical analysis. The shortcomings of the graphical approach, in my opinion, are that in order to get a fair amount of accuracy from the v.f.o.-i.f. frequency graph (fig. 1), the chart must be reproduced by hand to a larger size; an additional problem, if the graph is used extensively or repeatedly, is that it will need replacement soon, leading to more drafting work, as copying machines for large sheets aren't as readily available as for the standard 8½″ × 11″ paper.

The object of this article is to use the v.f.o.-i.f. frequency graph directly out of *CQ*. As many copies as needed can be Xeroxed at any time, assuring that no drafting mistakes are introduced in the process. No loss of accuracy will result from the mathematical approach, in fact, the accuracy will quite likely improve.

Spurious Calculations

I will use the same example originally given in Lee's article in order to simplify the whole analysis. Let's assume then that the mixing scheme under consideration is a 9 mc i.f. strip with a 5.0-5.5 mc v.f.o. which continues to be a fairly popular combination up to this date. A segment corresponding to the 5.0-5.5 mc range is then plotted in fig. 1, for an i.f. frequency of 9 mc. At this point the original article states:"...the plotted line for F_2 [called v.f.o. frequency in this article, therefore the segment for 5.0-5.5 mc] crosses the 3/5 line at 5.35 mc and the 4/7 line at 5.14 mc."

One has to take the author's word for these figures, as there is absolutely no way to check them out to the second decimal digit directly from the chart, because of its reduced size. Using the mathematical approach, however, it will be sufficient to observe that the plotted segment *does* cross the 3/5 and 4/7 lines, since the points of intersection will be calculated analytically. From plane analytical geometry, the slope m of a line going through two points of coordinates $P_1(x_1, y_1)$ and $P(x, y)$ is

$$m=\frac{y-y_1}{x-x_1} \qquad (1)$$

But in our case we are dealing with a family of lines, all going thru the origin of the axis. Consequently it is always true that $P_1(0, 0)$ and (1) becomes

$$m=\frac{y}{x} \qquad (2)$$

Starting with the 4/7 line (which in fig. 1 is one of those crossing the planned 5.0-5.5

---

*P.O. Box 2390, S. Paulo, Brazil

[1] Lee, J.G., "Mixer Spurious Frequency Analysis," *CQ*, September 1965, p. 42.

[2] Perolo, J., "A Transistorized Communications Receiver With Digital Frequency Read-Out," *CQ*, July/Aug. 1970, p. 14.

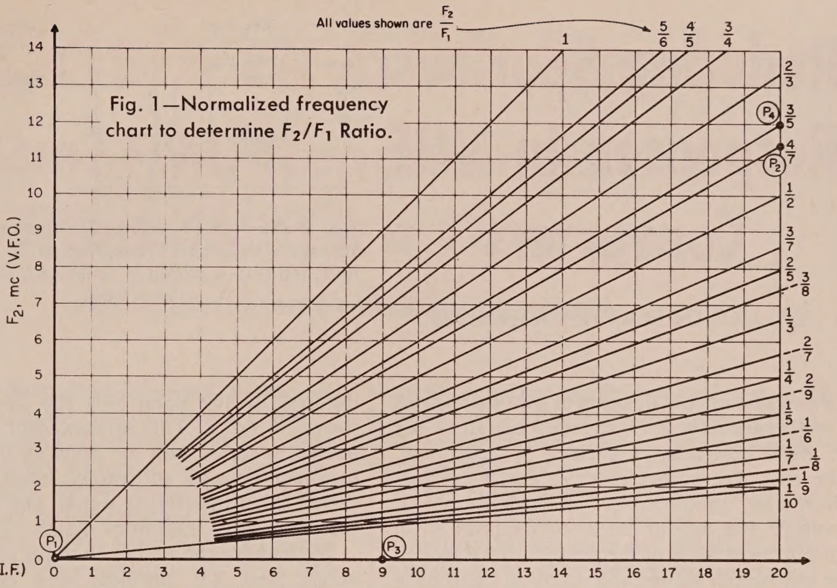

Fig. 1—Normalized frequency chart to determine F_2/F_1 Ratio.

mc v.f.o. range), one must now determine its slope $m(4/7)$. Since the family of lines of fig. 1 is normalized, it was originally constructed so that the intersect at $F_1=20$ mc would be the fraction indicated on each line) of 20 mc itself. In numbers, the 4/7 line intersect at $F_1=20$ mc is

$$(4/7)\ (20)=80/7=11.42$$

Consequently the coordinates of the point P_2 of intersect are $P_2(20, 80/7)$ or $P_2'(20, 11.42)$, whichever you prefer. From (2) the slope of the 4/7 line is

$$m(4/7)=\frac{11.42}{20}=0.571$$

Using standard form for (2) and substituting the value for $m(4/7)$ just obtained, one gets

$$y=mx \qquad (3)$$

$$y=0.571\,x \qquad (4)$$

Since the i.f. frequency under consideration is 9 mc, what must be written now is the equation of the vertical line intercepting the x axis at $P_3(x_3, y^2)$; since $x_5=9$ mc and the x axis at $P_6(x_7, y_3)$; since $x_3=9$ mc and y_3 will always be zero, then $P_3(9, 0)$.

Again, by plane analytical geometry the equation of such line is

$$x=x_3 \qquad (5)$$

Then by substitution $\quad x=9 \qquad (6)$

The point of intersect sought since the beginning is finally found by solving simultaneously (4) and (6). So

$$\begin{cases} y=0.517\,x \\ x=9 \end{cases}$$

$$y=(0.571)\ (9)$$

$$y=5.14 \text{ mc}$$

By identical reasoning, the 3/5 intersect is easily found. The intersect at $F_1=20$ mc is $(3/5)\ (20)=60/5=12$. Therefore the coordinates of P_4 are $P_4(20, 12)$. So

$$m(3/5)=\frac{12}{20}=0.6$$

$$\begin{cases} y=0.6\,x \\ x=9 \end{cases}$$

$$y=(0.6)\ (9)$$

$$y=5.40 \text{ mc}$$

Which shows that the 3/5 intersect is not 5.35 mc as reported in the earlier article, the deviation quite likely being a consequence of using a graphical approach, and well within the author's stated range of error.

The analytical approach described is, in practice, more accurate and more convenient than the graphical one: in conjunction with fig. 1 and properly used, it will lead to spurious-free mixer design, even though I still insist on my previous statement that a really spurious free design is easier to achieve on monoband projects. As the example given shows, if a designer is not particularly cautious on v.f.o.-i.f. frequency selection, even on a monoband scheme spurious do appear, the problem becoming substantially worse as the number of bands to be covered increases. ■

Reducing Spurious Responses In VHF Converters

BY IRWIN MATH,* WA2NDM

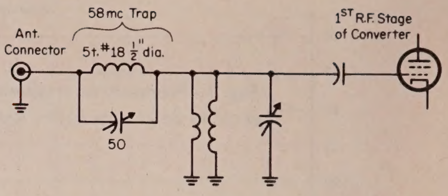

Fig. 2—To further reduce TV channel 2 interference with 6-meter reception, a 58 mc parallel-tuned trap is added in series with the antenna input lead.

After a couple of years of putting up with f.m. broadcast and TV spurious signals on my 6 meter converter, I decided to "clean-up" the unit. The basic converter uses a cascode front-end, triode mixer, and 14-18 mc i.f. output. The crystal oscillator operates at 36 mc. At least 30% of the people I have spoken to use similar setups and many of them have similar problems.

The main cause of channel 2 interference (at times it came in 5-9) proved to be the second harmonic of the crystal (72 mc) mixing with the 58 mc energy of the TV signal resulting in a 14 mc output. The addition of the series tuned trap as shown in fig. 1 completely eliminated this problem unless the beam antenna was pointed directly at the TV antenna on the Empire State Building about 5 miles away (50 kw is a lot of power). Then the TV images (previously spaced every 455 kc apart) completely disappeared.

Adjustment of the trap is simply to tune to an image and adjust the capacitor for minimum signal.

The final trick that completely cleared up the rest of the band was the 58 mc trap shown in fig. 2. This arrangement was connected in series with the antenna input. Adjustment consists of simply tuning the receiver to an interfering signal, and adjusting the trimmer to minimum signal.

By making the above changes in the converter, the TV problem was completely cured. Be sure to keep all leads short and use good mechanical support for the components.

The above suggestions can also be employed for the 2-meter enthusiast who has trouble with commercial f.m. signals. Many 2-meter converters employ a 43.3 mc crystal tripling to 130 mc to produce a 14-18 mc i.f. output. The second harmonic of these oscillators, 86.6 mc, beats with 100 mc f.m. signals to produce a 14 mc signal. The 86 mc trap shown in fig. 3 should do the trick.

Elmenco type 422 trimmer capacitors will be fine for all of the traps, and only cost about 28¢ each. If the tuning range of the traps is at either end of the trimmer's range, the coil turns can be spread apart or compressed slightly until the trimmers are near the center of their range. ■

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*5 Melville Lane, Great Neck, N.Y. 11021.

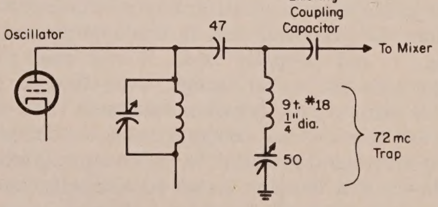


Fig. 1—Installation of a 72 mc series-tuned trap at the plate of the oscillator of a 6-meter converter with 14 mc i.f. to reduce channel 2 TV interference with the converter.

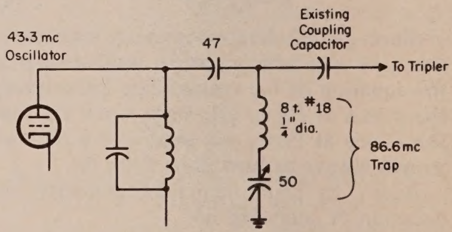


Fig. 3—Reduction of 100 mc f.m. broadcast with 2-meter converters using 43.3 mc local oscillators (tripled to 130 mc for 14 mc output), may be accomplished by the addition of an 86.6 mc series-tuned trap at the oscillator plate.

Crisis at 600 Feet

2m. F.M. Repeater Saves The Life of It's Operator

BY STEPHEN MENDELSOHN,* WA2HDF

YOU see, I have this GE Voice Commander that won't transmit, and therein lies a tale.

The evening of Thursday, May 20, 1971 found me on my way in to New York City from my home QTH at Amityville, Long Island to keep an appointment with Al Matthews, K1LTJ, who is one of the transmitter engineers at WXTV, channel 41. Al is also one of the people most responsible for WA2SUR, the 2 meter f.m. repeater located at the WXTV transmitter site at 70 Pine Street in the financial district of Manhattan.

Al had offered to take a look at the Voice Commander in an effort to get the transmiter working as well as the receiver, which was in quite good shape. I had managed to get 7 RCA 450 mc transceivers going during several evenings that week, but try as I might, the walkie-talkie, no! So at 8:45 EST I arrived at the repeater location. As I started to park the car a gentleman ran out of the building to ask me to pull the car up the block so as to give easy acess to the building fire hydrant. After complying with his request, I got out of the car to the tune of sirens on the arriving fire engines. As I looked up the side of the building, I saw smoke bilowing upward from the 15th floor. As a matter of interest to the other users of the repeater, I got back into the car and broke in to annuonce that there was a fire at the site of the repeater, but that the fire department had arrived. On getting back out of the car I turned on the walkie-talkie to find that the repeater was totally quiet. This in iself was quite unusual, as I have monitored WA2SUR for periods of up to 21 hours consecutively and have almost never found it to be unused for longer than one or two minutes. Seconds later out of the building ran hundreds of people who had been alerted by the fire bell. Al was not among them. Just then the repeater carrier went on and in a terrified voice Al yelled, "The room is filled with smoke, I can't breathe. Please, somebody get help. Get me out of here!"

At this point the fire chief had arrived and was starting to get out of his car. I ran up to him yelling that someone was still trapped by smoke in the building. He informed me that his people had just radioed a report that the building had been completely cleared. By this time Jim Landers, WB2DIA, was giving Al instructions to wet his clothing with water from the water cooler and lie on the floor. I pushed the chief back into his car to give emphasis to my statement and gave him the walkie-talkie to prove my point. He asked me exactly how I knew there was someone in there and I informed him of Al's call for help.

He finally went into action. Grabbing 8 men and two oxygen masks he sent them up in two teams of 4 in elevators on different sides of the building. Stairs would have been impractical as WXTV is on the 55th floor. According to the team that got to Al they found him stretched out on the floor near the repeater, and required a bit of help to get back his old habit of breathing. They brought him back down and for the first time I was able to eyeball Al for myself. I walked him outside and back to the car where he did a few deep breathing exercises.

In order to keep the boys, who were now all silent and listening, informed, I returned to the mobile rig and passed the word that I had Al, a bit shaken and dazed, but basic parts in good shape. I then informed the boys that we would be in a nearby place of refreshment to calm both our nerves. We would of course monitor with my Voice Commander. As we arrived at said oasis, Al told a rather chilling tale.

Al had been on the telephone with Ted

---

*551 Broadway, Amityville, N.Y. 11701.

Heuer, WA2RGB, when he had smelled smoke. He hung up with Ted, and went to investigate. Around this time the smoke started pouring in. The final kylstrons at WXTV are air and water cooled. There is a unit called a head exchanger which acts like a fan in a car—it forces cool air to cool a radiator core which dissipates heat from the water. This unit draws air from the elevator shaft and outside the building.

Due to this incoming air flow pattern smoke was being drawn into the room. As the room filled with smoke Al dialed 911, the police emergency number. He informed the operator who he was, where he was, and his problem. He was told to call the fire department as that sort of thing was their problem. As Al called the fire department he got through only a few words of his statement before they told him they were aware of the fire and hung up on him. The next call was placed to his studio facilities in Paterson, New Jersey. Al hurriedly told the technical director the problem. Obstacle number two! Channel 41 is an all-Spanish-speaking station, and Al in his mounting panic had forgotten to translate into Spanish what he told the technical director! They happily told Al something like, "Nice to hear from you again, old man" and hung up. Having no one else to call, and now on the floor trying to breathe in a four inch high space of remaining oxygen, he crawled to the repeater, pulled the receiver antenna plug so as to give him exclusive control of the audio to the transmitter and gave his last call. The last act he remembers up there was to replace the receiver antenna plug so the repeater would again be fully operational. All the rest is just a hazy blur of impressions. His next full memory was of seeing me outside of the building with him.

With Al safely in the car and recovering, Jim, WB2DIA, swung into action and did an excellent job of quarterbacking a large scale bid for publicity. The wire services, all of the New ork City newspapers, many of the smaller town papers outside of the city were offered the story, as well as many of the local radio stations. Some of the smaller stations on Long Island took the story, and I understand that three or four ran it. I called WCBS-AM the "Newsradio" outlet of CBS in New York, and after verifying that I was an employee of the company, gave me a reporter who took the story and I was told they ran it later on that night.

The next order of business was to inform Al's family that he was okay. This was accomplished by George LeDeoux, K1TKJ, who is the real father, licensed of WA2SUR, and supervisor of the WXTV transmitter. This gesture was a bit more ironic than it might seem, because George was on his day off and Al was doing the job at the transmitter hat he would normally do at the studio due to some special tests that were being run. This required the transmitter to be manned rather than be run by remote control. George ran a phone patch to Al's house and after Al assured them he was okay, instructions were given to turn on the base station and set up a listening post at home.

After several 807's and a good belt of 4-1000Z we made the decision to return to the scene of Al's "smoke-in." As the elevator let us out on the 55th flor, we were greeted by two reporters and a representative of the management of WXTV. Also on hand was a cloud of smoke about four inches thick hanging below the ceiling. For the next couple of hours Al was busy trying to get the WXTV facilities back to normal, the wire services, a few thousand questions from everybody at once and a call on the landline from George who wanted to know if the station had suffered any smoke damage.

With Al trying to satisfy everyone at once and get WXTV back on the air at the same time, it fell to me to answer the myriad of questions that all of the boys on the repeater wanted to know. To keep 75 to 100 amateurs quiet for over two hours is indeed a feat, and when let loose I was surprised at how the number had grown since the original report of the fire. By about 23:30 everything had quieted down and WXTV had shut down for the evening.

Al felt that he had recovered his composure enough to atempt the trip home to Connecticut in his VW bus. Before he got into the bus I requested the fellows to keep the frequency clear and to avoid mentioning the fire to Al as he was determined to make the trip home only so long as he felt that he had communications with his home. I made him promise to pull over and give a yell if he didn't feel he could make it, and with all the boys cooperating 100%, we both set off for our respective homes.

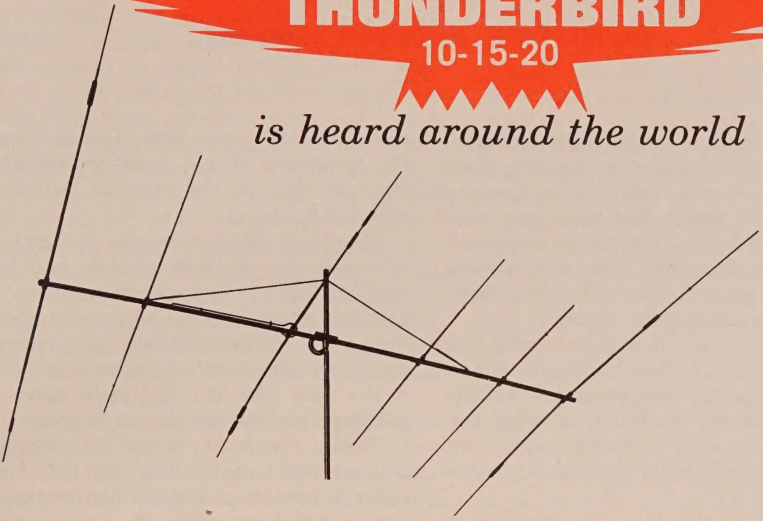
At this point I must mention the tremendous cooperation we got from the waiting

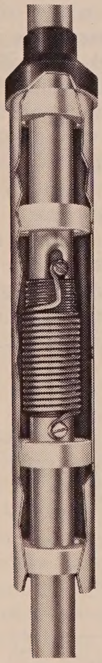
[*Continued on page 96*]

The voice of

HY-GAIN'S
THUNDERBIRD
10-15-20

is heard around the world





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The Garden Patch

A Junk-Box Phone Patch

BY PETER R. JENNINGS,* VE3GEJ

ONE of the most rewarding aspects of amateur radio can be found in handling third party traffic. Anyone who checks into any phone nets will realize that more and more traffic is being handled by patches every day.

For several years now, I have been using a very simple patch built from junk box materials with very satisfactory results.[1]

The requirements of a phone patch are quite simple really. It must be able to connect a transceiver to the telephone line without interfering with the operation of either system. The patch, shown schematically in fig. 1, is about the minimum required to do this job efficiently.

First, a d.c. load must not be presented to the telephone line. This is prevented by the two capacitors in series with the input, which pass the audio with almost no loss and yet present an infinite resistance to d.c.

The input to the patch must match closely to the impedance of the telephone line. This is 600 ohms and hence a 600 ohm audio transformer must be used between the transceiver and the phone lines. The windings of the secondary should have an impedance close to that of the receiver output and microscope input.

The telephone lines, because of their length can make an excellent antenna and hence pick up the r.f. from the transmitter. Precautions must be made to prevent this r.f. from being fed back into the microphone input of the transmitter or feedback will result. A low pass filter (L_1, C_2) easily solves this problem and bypasses the r.f. to ground.

Finally the patch should be completely disconnected from the line when not in use in order to prevent accidental interference with normal telephone operation.

Construction of the patch is very simple. The entire unit can be housed in a small Minibox or whatever the junk box will provide. My unit was housed in a surplus chassis of some type and had a built-in 5-pole triple-throw switch, which proved very useful for convenient one-switch operation. Of course several switches could just as easily be used with only slight loss of convenience.

A few words about the transformer are in order. The one used by the author came from the junk box, and appears to have suitable impedance characteristics, although this has

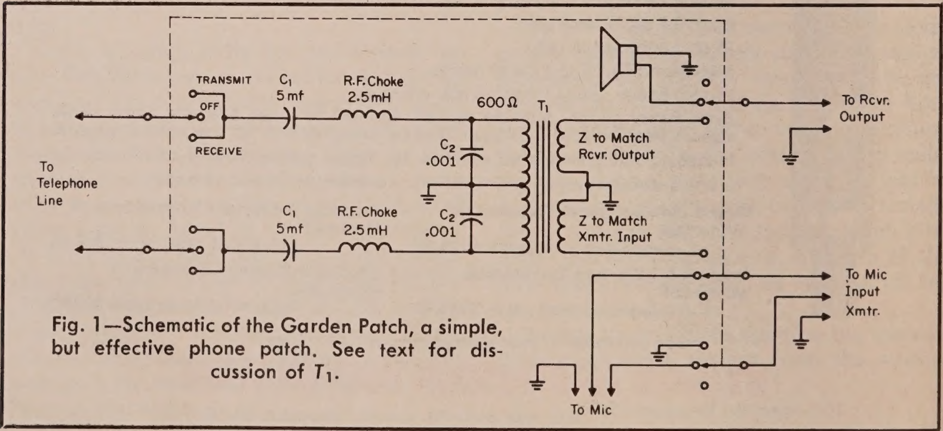

Fig. 1—Schematic of the Garden Patch, a simple, but effective phone patch. See text for discussion of T_1.

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*4600 Peach Ave., Niagara Falls, Ont.

[1] The patch is quite similar to one described in *CQ* for October 1958 by W6QID, "The Macy's Special Patch: $2.98." Credit for this previous work is acknowledged.

not been verified except to say that it works well. In practice, the actual impedances of the windings are relatively uncritical, provided they are not so far off as to reflect a very low impedance load to the telephone line such that levels begin to fall off. Unless an "oddball" transformer with the right impedances happens to be available, it might be advisable to use one of the popular"W2EWL s.s.b. rig" transformers which are still available from many surplus dealers and always in good supply at hamfest flea markets. This type of transformer has a 600 ohm primary and two secondary windings, one 22,000 ohms and the other 5200 ohms, all center-tapped. By using the high impedance winding and half the 5200 ohm winding (giving 1300 ohms impedance) for the Transmitter Input and Receiver Output respectively, the main mismatch will be at the receiver where it is easily compensated for by increasing the receiver audio gain.

The operation of the patch is quite simple. In the OFF position, the patch is disconnected from the telephone line, the speaker is connected to the receiver and the microphone is connected to the transmiter. In the RECEIVE position, the phone patch is connected to the telephone line, and the receiver output is fed into the patch. The receiver audio gain control is used to set the output level. In the TRANSMIT position the PTT lead from the transmitter is automatically grounded, thus switching the transmit-receive relay in the rig. The patch is connected to the transmitter microphone input. The mike gain control in the transmiter is used to adjust the transmiter audio level.

Before connecting the patch to the telephone lines it is advisable to check the d.c. resistance at the line terminals in all positions of the switch. If it is not infinite then something is wrong and should be corrected before proceeding further.

After connecting the patch to the line, tune in an average station. Dial a few numbers of your own telephone number in order to get a clear telephone line. Then, with a v.t.v.m. across the line terminals switch the patch to RECEIVE and increase the receiver audio gain until the output voltage peaks at 0.5 volts. The maximum signal that should be put on the telephone line is 0.75 volts, so 0.5 volts is used in order to prevent noise peaks from exceeding the maximum value. Listen to this volume in the telephone and compare it with the loudness of your own voice spoken into it. This can be your reference when the patch is in actual use.

[*Continued on page 96*]

The Side-Bridge C.W. Monitor

BY LEON A. WHEELER,* W6UYN

HAVING recently purchased a popular brand transceiver I found, to my surprise, it had no c.w. side-tone. Though the rig was designed to operate on c.w., it was necessary to add this accessory. Being one of the vast majority of operators who need a tone to keep those dits and dahs in order, I set out to rectify this deletion immediately.

My first thought was to use an old r.f. actuated c.w. module I had used with my Novice transmitter. The unit had performed admirably; however the old Mini-box I had packaged it in earlier just didn't go well with the new rig.

Then it hit me; since the unit needs r.f. to activate it, the natural place for it would be inside my s.w.r. bridge. The bridge is the Heath model HW-15. A phone jack installed on the rear apron facilitates code practice without activating the transmitter.

The oscillator is powered by a pair of AA pen cells in parallel. These fit neatly in place and require replacement about once a year under normal operating conditions.

The finished unit shows no signs of the additions.

---

*5111 Yorkton Way, San Jose, Ca.

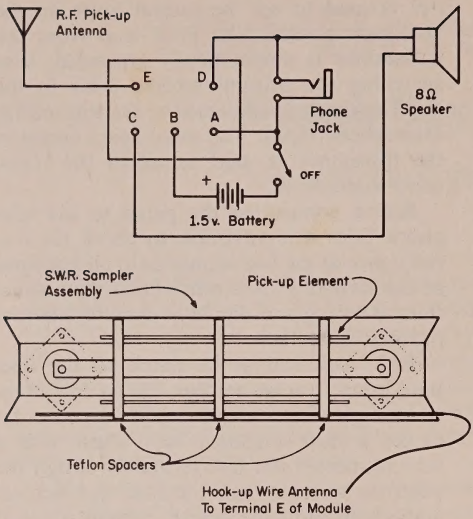


Fig. 1—No real wiring is necessary using the Cordover module. The pickup antenna is threaded under the teflon spacers of the s.w.r. bridge sampling line.

Construction

First assemble the oscillator module and a five-lug terminal strip to a small piece of Vector board. Bend the module's leads slightly where they protrude from the board, then tie them to the terminal strip. This will adequately hold the module in place. Mount metal stand-off spacers at each corner of the board to allow the sub-assembly to be bolted to the bottom plate of the HW-15.

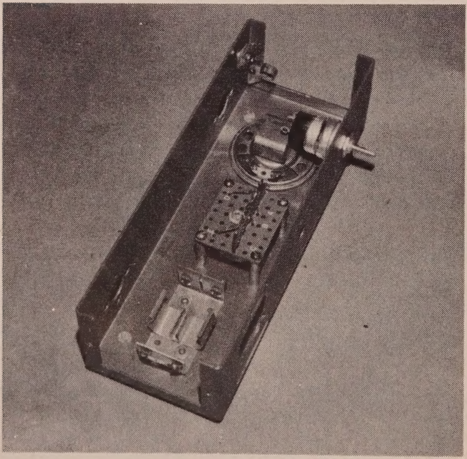
Next, lay out the new components in the chassis of the HW-15, marking the holes for drilling. The finished layout is shown in the photos. Take into consideration the additional depth required for the new sensitivity control. I used a piece of Vector board as a guide for drilling a number of 1/16″ holes for a speaker grill on the bottom of the HW-15 chassis.

After drilling and deburring the holes, all original components of the bridge are reinstalled in the chassis. Replace the original 50K sensitivity pot with the new one with the switch on the rear. Once all original components are mounted, you may permanently install the batery clip, speaker, phone jack and module sub-assembly.

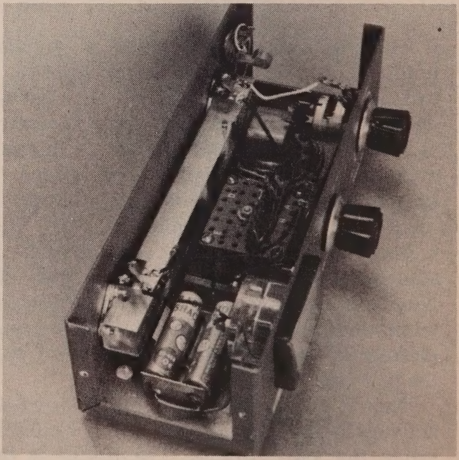
With all components installed, follow the Cordover instruction sheet for final wiring. The only variation from their instructions is the r.f. pick-up antenna where a length of hookup wire should be wedged between the teflon spacers of the coax s.w.r. bridge pick-up line. This wire will now be parallel to the r.f. pick-up element of the bridge.

Operation

To use the sidetone generator it is only necessary to insert the bridge in your transmission line in the normal manner, and pull the off/on switch out. When the transmitter is keyed, the tone will sound. Though a volume control was not incorporated, one could be. I have found the level of the tone optimum for average use. ■

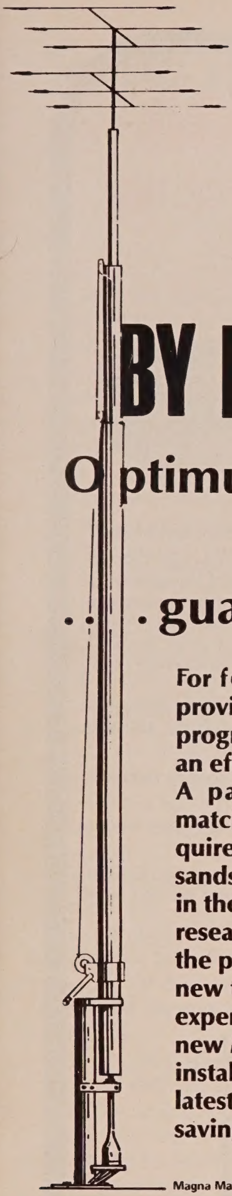


Side-Bridge components to be added are trial-fit inside the HW-15 s.w.r. bridge cabinet.



With wiring completed and bridge components re-installed, there is little room to spare.

ANTENNA PACKAGES BY HENRY RADIO



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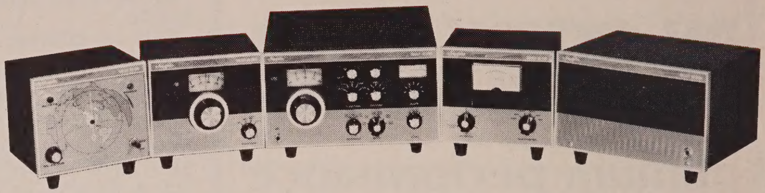

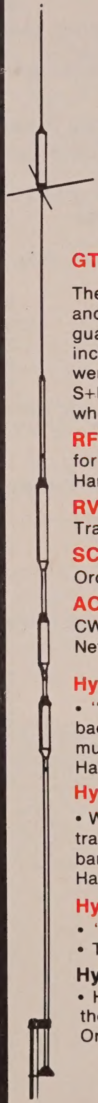

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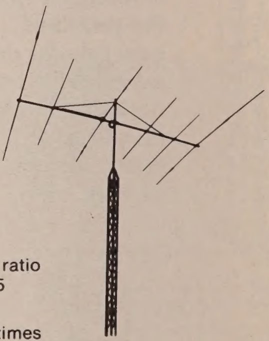

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Results of the
1970 CQ World Wide DX (Phone) Contest

BY FRANK ANZALONE,* W1WY

THE propagation predictions for this one (Oct. 1970) were for another good week-end. With record-breaking scores on practically all the bands I would say W3ASK has scored another one. That makes 30 predictions George Jacobs has more or less hit "right on the nose."

A total of 1425 logs have been received, a modest increase of only 2%, but it was incouraging to see that a good share of this was contributed by our own W/K's.

This year the Committee took a more critical look at the higher claimed scores. Most of them checked out OK. However a few showed a high score only because of excessive QSO duplication, or multipliers that could not be justified in a process of cross-checking of logs and station reports.

We are sorry that the following stations have to be disqualified for these infractions under Section XII of the Rules. WA1HFN, K4KJN, K8HZU on 28 mc and W2ONV, operated by W2VCZ on 14 mc.

It is understandable that in the heat of a contest you are bound to make some duplicate contacts, and there is no harm if these appear in your log. However we do expect you to check your log before submitting it, cross out these duplicates and take no credit for them.

If we have to do the job for you, you will have to risk the possibility of being counted "out." And claiming a multiplier because you think you worked a rare one is not enough, its got to be a confirmed two way contact.

If your listed score is lower than the one you submitted, take it as a suggestion to be more careful; next time you might not be so lucky.

We have often been asked, "what constitutes a contest QSO?" If you work a station during the contest and he tells you he is not in the contest, does not know his Zone number, or does not want to get involved, you still have established a two way contact. Therefore our answer is very simple. "Any valid two-way QSO." Even if its with a "hardhead" who refuses to give you a number because he hates contests. The exchange of a contest number is desirable, but not a must.

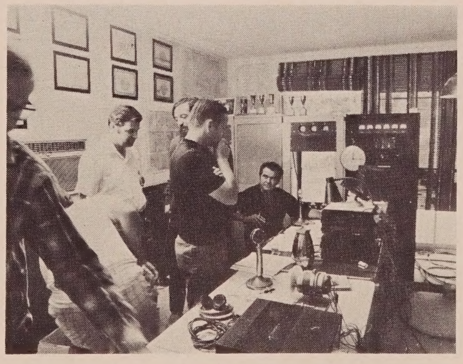
The big highlights of this year's contest were the many Contest Expeditions that participated. No less than 8 major multi-operator groups made trips to strategic spots.

All deserve mention and consideration, but it was the Kuri Island operation by W7UXP, KH6HGP and WB2OIF that was judged the winner of the Stuart Meyer, W2GHK Contest Expedition Trophy. This rare spot was made available on all bands to over 3300 contacts.

You can usually expect to hear Lord Howe Island in a contest. This year the trip was made by AX2APX, AX2BKM and W6CR.

The Galapagos was another good one, HC8AA operated by HC1RF and HC1SG produced over 3100 contacts, probably a new one for many.

Haiti is a long way from the West Coast but it was W6DQX, W6EJJ and W6WLH that fired up HH9DL and passed out over



Only 15 mins. after the Contest was over, the gang at W6VSS got the bad news that Rush Drake and his crew at W7RM claimed a higher score. Well, there's always next year Dale, its back to the drawing board. Part of the dejected crew. L. to R.—WB6VFJ, W6UED, K6QPH, K6-SEN, K2RBT and the boss man himself, W6VSS.

---

*Contest Chairman, *CQ*.

PLAQUE & TROPHY WINNERS

Single Operator, Single Band

World—North Jersey DX Association. Dr. Harold Megibow, K2HLB Memorial Won by Mario Rebufello, CW4CR (21 mc)

Canada—Gene Krehibiel, VE6TP Trophy. Won by Dale Green, VE7SV. (14 mc)

Carib./C.A.—Gus Huether, HR2GK Trophy. Won by Jose Carrion, Jr. KP4DDO (28 mc)

So. America—Brazil DX'ers Trophy. Won by Janusz Grzesiowski, YV1LA (14 mc)

Single Operator, All Band

World—Bill Leonard, W2SKE Trophy. Won by Herb Schoenbohm, KV4FZ.

U.S.A.—Potomac Valley R.C. Trophy. Won by Robert Ferrero, K6AHV.

Canada—Jack Baldwin, VE3BS Trophy. Won by L. G. Sawkins, VE7BDL.

Europe—W4BVV Operators' Trophy Won by Walter Skudlarek, DJ6QT.

Carib./C.A.—Harold Fox, W3AA Plaque. Won by Fernando Vallarta, 4B1AE.

Africa—Gordon Marshall, W6RR Plaque. Won by Cristina Labin, EA8GZ.

Asia—Japan CQ Magazine Trophy. Won by Philip Wight, VS6DR.

Oceania—Jack Chalk, KC6EJ Trophy. Won by KH6RS, Richard Norton, Opr.

Multi-Operator, Single Transmitter

World—John Knight, W6YY Trophy. Won by Station PJ9AF. (Oprs. W1FJJ & W3KMV)

Canada—Calgary A.R.A. Trophy. Won by Station VE2UN/2. (Oprs. VE1JN, VE2-DCW, WA3HRV)

Multi-Operator, Multi Transmitter

World—Radio Club Venezolano Trophy. Won by Station DK0WA. (Oprs. DK1FW, DK2BG, DK2BI, DJ1ER, DJ2BW, DJ2HH, DJ4PX, DL1CF, DL9OH, VS6AA, VS6DD.

Contest Expedition

World—Stuart Meyer, W2GHK Trophy. Won by Station W7UXP/KH6. (Oprs. KH6-HGP, W7UXP, WB2OIF)

Special CQ Plaques

U.S.A.—All Band Champion. Gordon Marshall, W6RR.

World—Multi-Multi Champion. Station OH-5SM. (Oprs. OH—2BCP, 2BH, 2BO, 2SB, 2WI, 3QA, 5NQ, 5NW, 5SE, 5SM, 5TS, 5UQ, 5VY, 6RM, 6SM)

4100 QSO's from this seldom heard spot in a contest.

PJ9AF, winner of the John Knight, W6YY Trophy, was a two man operation by W1FJJ and W3KMV. Their total of almost 4600 contacts reached an incredible pace of 200 per hour during the peak hours.

BEAT EVERYBODY !
DK0WA

The big Multi-Multi crew at DK0WA was out to beat everybody. They didn't quite make it, OH5-SM is still the Champ, but did win the Radio Club Venezolano Trophy. L. to R.—Starting from top row: DK2BI, VS6DD, VS6AA, DL9OH, DJ4-PX, DL1CF, DJ2HH, DK2BG, DK1FW, a s.w.l., DJ1ER, DJ2BW.

Another highly successful operation was VP1WMU by a group from the Lafayette ARC. This was a special call assigned to W5WMU, the rest of the crew was made up by K5TTA, W5IOU and WN5AAA. Even 160 was made available but Pat the licensee feels the regulation compelling a multi single station to stay on one band at least 15 minutes, hampered their operation on this band. I don't agree, but that's another story.

The Caribbean islands were well covered by VP2EE and VP2VP. The Anguilla expedition was made possible by Dave Zeph, W9ZRX, licensee of VP2EE and PJ7JC, K9-RHN, W9IGW and W9ZTD. Time was taken out of their productive operation on other bands to give 24 stations a shot at a new one on 160 s.s.b.

And VE3ACD and VE3GMT made their annual trip to the British Virgins and help VP2VI put VP2VP in the Top Six of the Multi Single stations.

And last but not least the big multi-multi operation from VP9DX, a special call from the Contest and manned by VP9BY, W2DXL, W3NNK, K4SHB, W4BRB and WB4OUH. Their 4607 QSO's was the highest made in the contest. A little more concentration on

Single Operator — All Band

Station	QSO's						Zones						Countries					
	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28
KV4FZ	35	336	430	1401	1064	1096	6	16	16	37	30	23	7	43	53	106	85	75
KH6RS	3	197	343	681	917	1352	1	16	18	35	29	24	1	17	31	84	51	42
PZ1AH		75	196	460	472	998		8	17	32	25	23		16	43	90	68	64
AX6HD		29	132	792	632	486		13	21	33	26	22		14	29	89	53	60
VS6DR		19	131	744	760	940		11	19	38	35	31		14	27	106	74	82
DJ6QT		177	81	307	509	617		11	15	32	34	29		46	45	95	78	70
W6RR		40	116	310	627	468		15	21	37	27	30		23	33	83	70	76
EP2BQ		62	86	471	282	821		8	9	32	24	20		26	29	92	62	63
K6AHV		34	138	218	887	269		18	20	34	32	25		22	38	75	74	55
KS6DH		61	93	797	433	943		9	11	35	26	21		8	12	64	40	34

Multi-Operator — Single Transmitter

Station	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28
PJ9AF		196	515	913	990	1984		10	15	29	22	26		27	33	65	49	56
PJ1AA		92	443	672	1043	1132		8	15	31	27	31		27	40	85	71	73
UK9ABA		110	260	805	565	349		14	26	38	35	32		46	63	124	100	101
HH9DL		279	722	824	963	1350		11	16	32	19	19		35	44	84	50	50
VP2EE	24	162	288	1026	1104	933	4	11	17	30	23	25	4	26	46	93	62	59
VP2VP		136	255	1283	738	755		10	17	32	24	22		20	44	97	63	55

Multi-Operator — Multi-Transmitter

Station	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28	1.8	3.8	7	14	21	28
OH5SM	24	388	523	856	1477	878	2	18	28	39	37	36	7	57	85	139	126	119
DK0WA	70	354	322	1127	1086	1045	2	14	21	38	37	35	12	55	77	145	122	82
W3AU	10	94	196	785	1215	771	4	16	28	39	37	34	5	40	70	145	128	111
4Z4HF		163	312	1155	1380	1081		10	16	34	33	38		40	44	110	91	74
W7RM	6	140	325	744	1878	560	6	17	24	37	38	31	6	42	55	122	101	73
W6VSS	19	117	324	770	1350	524	6	20	25	37	32	28	6	34	57	113	93	72

Band-by-band breakdown of top scores.

their multiplier would have made a big difference in their score, but I guess with all those state-side stations on your back that's a rather difficult thing to do.

I think I have covered all the Contest Expeditions, at least all the major ones. Forgive me if I haven't, I know I have probably left out some of the individual efforts, but space is running out on me.

I know I will be chastised for not giving Herb Schoenbohm, KV4FZ his just due for his 4.9 million score, which just fell short of the all time record set by Don Miller back in 1967. And only mentioning that that big score out of KH6RS was made by Dick Norton, W6DGH seems hardly enough. And what do I do about Mario Rebufello, CW4-CR on 21 mc and Janusz Grzesiowski, YV1-LA on 14 mc, both setting new records. If I went into a big speel about their performance then the other guys would get miffed. So I had best leave good enough alone, the rest of you fellows (and gals) get your reward in the Trophy, Plaque and Top Scores listings.

Speaking of the Plaque and Trophy winners. The top scores in the many different divisions are not necessarily the winners. There are many factors that have to be considered before making a decision, one being that a station may only win the same Trophy once in a period of three years (hence the Special *CQ* Championship Plaques).

Another is the stipulation by the donors that only native or permanent residents are

[*Continued on page 96*]

If you're a 160 man you should recognize all that equipment at the right. That's a lot of weight to haul all the way to VP1WMU to make you Top Banders happy. L. to R.—One of the local boys, W5IOU, W5WMU and W5TTA.

TOP SCORES

SINGLE OPERATOR ALL BAND

KV4FZ	**4,961,551**	**DJ6QT**	**1,982,435**
KH6RS	**3,595,049**	**W6RR**	**1,837,620**
PZ1AH	2,471,558	EP2BQ	1,799,450
AX6HD	2,181,240	**K6AHV**	**1,748,950**
VS6DR	2,095,415	KS6DH	1,742,520

SINGLE BAND

28 mc

KP4AST	630,180
YV1TP	505,455
4M4CDK	504,160
KH6GMP	454,181
DL6EN	374,875
LU5FEH	307,700

7 mc

YV1BI	142,496
KH6GLU	64,437
I1AIM	53,295
K2GXI	44,978
PY7BFN	28,168
I1LCK	25,488

21 mc

CW4CR	**1,196,085**
KG6AQY	749,528
KH6BZF	603,512
CX1JM	543,630
KH6IJ	516,061
VE7LB	499,590

3.8 mc

LA0AD	80,754
EA4LH	54,270
SM5DSG	24,461
K3UZE	18,054
DL8PC	17,052
YV4UA	16,340

14 mc

YV1LA	**1,012,000**
CR6IK	961,625
4M5AXT	882,200
PY4OD	817,005
TJ1AW	809,200
CE6EZ	680,798

1.8 mc

GM3YCB	1,204
HB0XKZ	996
PA0PN	320
WA4SGF	132

MULTI-OPERATOR SINGLE TRANSMITTER

PA9AF	**4,536,780**	HH9DL	3,302,640
PJ1AA	4,067,352	VP2EE	3,217,200
UK9ABA	3,377,307	VP2VP	3,008,356

MULTI-OPERATOR MULTI TRANSMITTER

OH5SM	**6,408,171**	4Z4HF	5,683,200
DK0WA	**5,809,280**	W7RM	5,627,088
W3AU	4,741,523	W6VSS	4,506,696

Number groups after call letters denote the following: Band (A-all); Final Score; Number of QSOs; Zones and Countries. Certificate winners are listed in **bold face.**

SINGLE OPERATOR NORTH AMERICA

United States

K1ZND	**A**	**874,400**	**780**	**109**	**291**
W1OKG	"	752,400	753	104	256
K1KSQ	"	723,600	721	98	262
WA1IRG	"	629,970	661	92	253
W1YK	"	210,944	304	83	173
WA1FBX	"	178,707	304	66	147
K1DPB	"	158,389	318	57	130
WA9HHH/1	"	115,005	241	62	125
K1GUD	"	113,393	240	56	111
W1FAY	"	111,276	204	55	143
W1CHA	"	108,395	240	46	117
W1FLN	"	104,016	233	60	116
W1PL	"	94,860	217	60	110
W1ESN	"	90,728	200	58	106
W1WY	"	75,366	178	52	106
W1CNU	"	71,000	198	39	86
WA1KZE	"	55,120	172	42	88
K1WMQ	"	48,174	157	36	75
G3XPM/W1	"	41,250	125	44	81
W1DQK	"	38,520	121	37	83
WA1MCY	"	12,232	98	13	31
K1VTM	"	9,009	56	26	37
WA1LMQ	"	5,474	48	18	28
K1DCB	"	5,000	30	12	28
W1EGM	"	792	17	8	11
W1BIH	**28**	**146,588**	**407**	**29**	**98**
K1LWI	"	94,990	290	29	86
K1CSJ	"	94,683	276	25	86
K1AJQ	"	76,501	242	28	85
W1EZD	"	69,400	240	26	74
W1CWU	"	50,400	183	26	70
K1SHN	"	20,574	93	23	58
WA1EXE	"	8,536	70	1[illegible]	31
K1TZD	"	5,808	46	17	31
W1RIL	**21**	**346,495**	**922**	**34**	**97**
K1HVV	"	183,882	536	21	93
WA1JQT	"	24,528	161	15	41
W1PLJ	"	1,420	25	5	15
W1OKA	**14**	**58,938**	**229**	**27**	**67**
W1UYU	"	47,615	196	23	66
W1EBC	**3.8**	**7,304**	**74**	**10**	**34**
W1CKA	"	2,010	28	10	20
W2PV	**A**	**1,597,278**	**1260**	**117**	**336**
W1BGD/2	**A**	**1,494,614**	**1169**	**125**	**326**
K2DJD	"	681,264	708	96	246
WA2FCA	"	625,518	664	98	244
WB2CKS	"	517,374	519	102	249
WA2DHF	"	299,065	500	66	149
WA2BZA/2	"	264,966	406	74	163
K2QIL	"	263,000	388	75	175
WA2EAH	"	224,334	393	62	144
W2EHB	"	203,820	311	72	165
W2UI	"	147,210	308	56	131
W2LEJ	"	121,362	247	59	120
W2AMM	"	100,128	232	45	104
K2KIB/2	"	64,945	157	56	99
W2ITG	"	24,543	105	26	55
K2RYI	"	18,216	99	23	49
K2UCJ	"	15,904	92	26	45
W2CVW	"	13,760	65	27	53
W2MB	"	9,240	59	19	41
K2QBW	"	1,750	20	15	20
W2HAE	"	697	16	8	9
W2YT	**28**	**212,725**	**580**	**29**	**98**
WA2BYJ	"	101,696	311	28	83
W2QKJ	"	45,299	168	24	73
K2JMY	"	43,265	168	24	65
WA2AUB	"	25,428	116	22	56
WA2DZG	"	13,585	88	18	37
WB2KHO	"	7,550	58	16	34
F3VN/W2	"	280	7	7	7
WA2ILK	**21**	**131,924**	**391**	**30**	**88**
WB2NXL	"	120,120	348	29	91
WB2MQI	"	20,176	135	14	38
W2KZN	"	10,452	77	15	37
VE2MW/W2	**14**	**91,203**	**257**	**35**	**94**
K2GXI	**7**	**44,978**	**215**	**23**	**63**
W2SKE	**3.8**	**4,182**	**47**	**12**	**22**
WA3HGV	**A**	**959,593**	**866**	**106**	**295**
W3DQG	**A**	**546,150**	**600**	**93**	**238**
W3VEQ	**A**	**529,596**	**615**	**90**	**223**
K3TGM	"	455,750	640	69	181
W3VT	"	426,123	434	101	238
W3WPG	"	405,483	555	83	198
W3GRF	"	357,698	543	68	161
W3DHM	"	302,544	394	79	185
K1LPL/3	"	301,644	409	82	184
W3AXW	"	287,040	394	86	190
W3KV	"	269,115	411	67	166
K3AIG	"	258,448	401	71	161
W3NX	"	256,956	349	82	184
K3JLI	"	203,310	331	72	179
W3KT	"	159,004	241	82	172
W3OV	"	140,736	271	65	127
W3CRE	"	135,824	243	61	147
W3EQA	"	105,462	211	65	121
W3DRD	"	101,704	214	60	113
W3GBE	"	96,302	201	59	120
W3HVM	"	79,476	195	51	97
WA3GZT	"	68,832	171	44	100
W3CGS	"	68,208	176	47	100
W3NZ	"	65,764	159	57	107
K3TVE	"	52,197	149	40	87
WA3JIH	"	40,221	134	40	76
WA3IXF	"	35,190	128	37	65
W3ZJ	"	32,368	104	43	69
W3KE	"	30,704	117	39	62
W3QOR	"	28,968	103	35	67
W3GHD	"	24,062	87	35	71
K6JVE/3	"	23,184	109	29	55
W3YHR	"	16,520	113	15	41
W3ML	"	15,170	77	33	49
W3EVW	"	12,600	67	27	45
WA3NNA	"	11,591	65	27	40
W3CBF	"	10,088	67	15	39
W3SMX	"	8,024	52	25	34
WA3LXL	"	1,404	24	9	18
WA3ENM	"	1,170	16	15	15
W3KDD	**28**	**156,552**	**420**	**30**	**102**
W3ZNH	"	123,840	336	31	98
W3PZW	"	87,780	268	28	86
W3BRZ	"	54,400	195	26	74
W3BRB	"	52,089	197	26	71
WA3HMM	"	22,311	116	18	48
W3SDV	"	21,909	109	20	54
K3YVN	"	8,358	69	10	32
W3UHN	**21**	**2,210**	**31**	**18**	**8**
W3BWZ	**14**	**152,694**	**363**	**38**	**115**
K3MBF	"	35,150	133	30	65
WA3COJ	"	14,280	100	16	40
W3MVB/3	**7**	**8,326**	**70**	**14**	**32**
W3UZE	**3.8**	**18,054**	**132**	**16**	**43**
WA3LKH/3	"	9,861	71	15	42
K3RUQ	"	7,802	76	13	34
W4KXV	**A**	**1,212,674**	**973**	**125**	**321**
W4SYL	"	655,695	591	110	295
W4WSF	"	510,616	566	88	244
K4TTA	"	499,032	529	104	244
W9MIJ/4	"	410,225	490	85	220
WB4SJG	"	339,300	481	83	178
WA4MSU	"	333,592	409	82	214
K4ARP	"	307,458	422	83	196
WA4IVL	"	295,596	388	81	195
K4KQ	"	266,197	360	84	193
W4DM	"	249,022	388	66	167
WA4FFW	"	243,639	365	79	174
W4PGW	"	223,425	368	71	154
K4BBF	"	193,116	317	75	167
W4DQS	"	189,888	292	72	164
K5YPS/4	"	182,532	307	68	144
W4TMR	"	161,838	282	79	143
W4WRY	"	149,124	288	65	139
WA4YBV	"	127,224	254	54	132
WA4FZA	"	111,020	237	60	122
K4ZA	"	82,134	183	55	114
W4BJ	"	81,964	187	40	84
K4HHA	"	79,826	185	59	108
K4OD	"	78,218	178	55	122
WB4ORM	"	61,308	182	48	83
WB4JSV	"	50,553	143	46	91
W4HOS	"	45,920	131	59	81
WA4KYR	"	45,508	141	41	83
W4ZM	"	38,874	131	43	71
K5VYT/4	"	38,688	118	45	79
K4ASI	"	36,480	121	39	75
W4SGE	"	34,344	111	40	68
W0YVA/4	"	32,301	131	26	71
W4UPT	"	28,290	102	46	69
W4KMS	"	23,793	90	37	66
K4HA	"	7,497	49	21	42
W4GF	"	5,610	39	22	33
K4EPI	"	1,575	30	15	20
W4LBP	**28**	**211,068**	**599**	**29**	**94**

W4CRW	“	105,000	298	29	96
W4VAN	“	76,266	238	29	85
K4MG	“	57,222	202	28	74
W4ZTW	“	52,518	210	26	63
K4IIF	“	31,248	131	24	60
WB4LVD	“	29,792	140	25	51
W4EZ	“	29,274	105	27	75
W4GZD	“	22,081	119	22	49
WA4AUL	“	18,546	101	19	47
W4BGH	“	12,152	87	17	39
W4MMD	“	7,790	65	12	29
W4NTE	“	3,150	35	11	24
W4OGG	“	2,448	31	14	22
K4AUA	“	2,052	28	8	19
WA4UXU	**21**	**201,845**	**536**	**31**	**102**
W4NQM	“	180,285	540	29	90
WB4LHF	“	113,680	348	27	89
W4TXE	“	75,100	270	25	75
W4DRW	“	73,950	266	29	73
WA4CCW	“	40,320	162	24	66
WB4NNS	“	16,555	109	15	40
K4AEH/4	“	1,380	22	8	15
W4AXE	**14**	**595,725**	**1068**	**39**	**156**
W4DFK	“	104,276	288	36	95
WB4QKE	“	70,686	219	30	89
K4PDV	“	64,068	200	31	83
K0ECG/4	**3.8**	**3,310**	**46**	**11**	**28**
WA4LDM	“	736	14	9	14
WA4SGF	**1.8**	**132**	**16**	**5**	**6**
W5NMA	**A**	**361,797**	**529**	**77**	**172**
W5RSZ	“	226,728	338	89	179
W5OB	“	67,890	176	53	102
WB5AED	“	44,289	165	57	78
W5QNY	“	28,928	106	43	70
WA5UCT	“	21,800	83	38	62
W5EDX	“	15,876	62	37	61
WA5GDS/5	“	4,312	36	24	25
W5RMC	**28**	**101,808**	**374**	**25**	**76**
WA5CBT	“	67,266	247	26	75
WA5ZXO	“	62,923	247	23	66
W5OYH	“	46,000	140	25	67
WA5SOG	“	11,970	100	20	37
K5IKL	“	8,580	80	16	21
WA5AER	“	4,154	53	16	30
W5EQT	**21**	**188,074**	**528**	**33**	**101**
W5RTQ	**14**	**15,656**	**77**	**30**	**46**
K5PFL	**3.8**	**1,802**	**25**	**12**	**22**
W5KC	“	1,012	26	8	15
W6RR	**A**	**1,837,620**	**1561**	**130**	**285**
K6AHV	**A**	**1,748,950**	**1546**	**129**	**264**
K4BVD/6	**A**	**1,046,639**	**1130**	**119**	**200**
W6MAR	“	818,554	913	111	208
WB6WIT	“	806,680	858	111	224
K6ERV	“	750,065	799	116	223
WB6GFJ	“	459,008	650	89	176
W6JPH	“	452,625	634	93	162
W6CYX	“	389,424	564	97	147
W6HQN	“	331,978	472	91	162
W6WX	“	321,507	451	95	162
WA6ISX	“	289,480	448	81	141
W6ZKM	“	265,620	412	89	139
K6ITL	“	252,350	506	67	108
K6BTT	“	248,465	434	76	141
W6BH	“	239,904	380	70	154
WB6QLZ	“	194,832	476	60	84
W6CS	“	127,224	270	67	119
K6SSN	“	120,335	225	77	128
WB6UOM	“	115,855	312	57	88
WA6AHF	“	113,665	235	69	110
W6EYY	“	112,350	274	61	89
W6NJU	“	110,774	223	79	115
W6JKR	“	106,463	193	89	138
W6BHH	“	101,870	231	68	99
W6AEM	“	99,426	238	59	87
W6JKJ	“	96,707	208	69	104
W6APW	“	81,269	168	71	110
K6PIH	“	75,174	190	60	74
W6YRA	“	67,670	187	54	80
K6BCE	“	66,825	193	56	79
W6YVK	“	56,753	202	47	56
K6OC	“	51,170	160	54	65
WB6WAV	“	50,394	168	51	60
WB6LMN	“	40,330	140	47	62

Bet "Poochie" will jump with joy when he learns that his mistress, EA8GZ won the W6RR African Award. Congratulations Christina, maybe that will wake up some of those lackadaisical OM's over there.

W6ZBS	“	38,908	115	55	82
WB6IDZ	“	31,765	141	37	47
W6EJ	“	31,436	104	46	70
W6KHS	“	30,580	80	53	57
W6CLM	“	27,270	119	43	47
K6KUQ	“	26,390	133	33	37
VE7BNE/W6	“	23,870	117	31	46
K6TXA	“	22,523	78	45	56
K6MHD	“	16,104	84	33	33
K6AO	“	14,238	79	26	37
WA6KHE	“	5,328	47	24	24
WB6NRK/M	“	5,029	44	20	27
WA6TKT	“	4,956	45	21	21
K6KQN	“	3,800	35	18	20
W6EJA	“	2,904	31	15	18
W6GBY	“	2,618	27	16	18
WB6WIW	“	2,100	21	18	17
WA6LLY	“	1,624	22	13	15
K6YFZ	“	912	17	7	12
W6KG	“	713	12	11	12
W6CCP	**28**	**206,195**	**647**	**31**	**84**
WB6AQF	“	176,085	577	30	75
WB6UDC	“	111,384	488	27	64
WA6FIT	“	81,510	372	25	53
W6AOI	“	11,970	78	20	37
K6SVL	**21**	**271,400**	**832**	**32**	**83**
W6HX	“	268,400	758	32	90
K6ZQP	“	245,872	726	33	88
K6JAN	“	70,494	369	26	67
WB6ZSU	“	7,160	65	15	25
WB6HHQ	“	4,061	49	13	18
K6NA	**14**	**204,815**	**519**	**37**	**100**
K6QW	“	147,672	411	36	90
W6GRV	“	102,564	299	37	89
K6YRD	“	101,388	309	36	83
W6FXB	“	92,664	293	35	82
K6YRA	“	50,710	178	33	77
W6EUF		43,359	159	34	64
W6OK	“	27,492	131	30	49
W6QJW	**7**	**21,730**	**157**	**15**	**38**
WA6DKF	**3.8**	**3,977**	**40**	**15**	**26**
K6SXA/6	“	3,800	44	15	23
W6ISQ	“	1,144	19	12	14
K7YWZ	**A**	**462,024**	**600**	**99**	**177**
W7RS	“	392,720	482	90	170
WA7NIN	“	354,382	596	90	148
K7PXI	“	219,220	401	70	124
W7YBX	“	211,296	399	79	134
WA7DTG	“	192,584	431	69	112
W7RI	“	188,570	384	55	118
WA7CGR	“	160,793	440	52	75
W7FQY	“	101,179	207	72	109
W7PJK	“	100,100	261	58	82
W7AKU	“	39,889	130	47	66
W7VRO	“	27,144	104	47	57
W7QN	“	23,712	95	41	55
W7QCV	“	8,294	58	27	31
W7IR	**28**	**143,967**	**454**	**29**	**82**
W7UDG	“	91,900	318	29	71
W7CRT	“	68,808	256	27	67
W7BJ	“	40,468	214	22	45

W7AYY	“	35,950	195	23	42
WA7CWM	“	29,585	224	21	40
K7RDH	“	21,312	110	21	53
WA7MKC	“	15,848	106	20	36
K7RSB	**21**	**198**	**9**	**6**	**5**
W7NG	**14**	**37,350**	**164**	**28**	**55**
K7ORN	“	9,296	66	23	35
WA8ZDF	**A**	**635,950**	**664**	**112**	**238**
WA8NYB	**A**	**459,316**	**570**	**83**	**203**
WA8OSE	“	403,641	495	92	209
W8TWA	“	344,100	421	95	205
WA8JUN	“	319,381	423	90	187
W8MVN	“	246,840	386	75	180
W8AJW/8	“	231,693	377	75	156
WB8CCE	“	228,160	357	76	172
W8AEF	“	220,416	333	84	172
W8MEL	“	208,380	336	83	172
WA8PRR	“	192,720	323	66	153
W8DQL	“	178,708	300	75	142
K8GVK	“	135,917	254	67	132
WB8AOE	“	122,850	255	57	125
W8MBB	“	70,350	180	51	99
LA7HH/8	“	69,273	148	57	122
W8AQZ	“	48,772	132	48	89
W8II	“	31,944	107	46	75
WB8EAS	“	31,828	131	41	68
W8JTU	“	30,564	107	34	74
WB8FNE	“	30,160	111	35	69
W8JTD	“	23,805	76	46	69
W8TWJ	“	11,948	73	22	36
W8FJS	“	9,715	55	22	45
W8YGR	“	9,398	50	31	43
K8QYG	“	6,188	42	18	34
W8GBH	“	5,656	41	24	32
W8ELB	“	5,600	37	25	31
W8HXZ	“	4,988	42	18	25
K8YSD	“	4,012	41	13	21
K8BPX	“	3,420	37	13	23
WA8QIY	**28**	**177,243**	**474**	**29**	**102**
W8IMZ/8	“	145,656	438	28	91
WA8VBY	“	96,900	293	29	85
WB8EUN	“	91,304	280	28	85
K8SMC	“	84,550	325	27	68
WA8TKM	“	45,696	171	24	71
WA8ASV	“	39,949	161	24	67
WA8TDY	“	30,294	135	23	58
K8BVY	“	26,250	127	24	51
K8MMH	“	21,021	102	23	54
WA8MEH	“	20,650	128	17	42
K8CGD	“	15,892	98	15	43
W8GOC	“	14,581	97	16	37
W8IDM	“	455	13	4	9
K8ULU	**21**	**92,106**	**272**	**32**	**87**
WA8FVW	“	43,415	158	27	67
W8GHN	“	28,620	101	31	75
WA8LRE	**14**	**305,950**	**730**	**38**	**107**
WA8ZDT	“	141,645	378	37	96
WA8MQP	“	24,244	125	23	53
K8EHU	**3.8**	**5,922**	**59**	**13**	**34**
W8BDO	“	4,563	52	11	28
K9ECO	**A**	**864,830**	**794**	**120**	**274**
W9EWC	“	344,244	398	97	204

WA0SDC/9	“	109,296	211	66	141
K9OCX	“	45,298	123	50	92
W9RQM	“	40,992	134	35	77
K9YXA	“	32,307	96	44	77
K9RJO	“	30,012	97	48	74
W9MCR	“	29,480	100	40	73
W9GXH/9	“	23,256	83	38	64
W9WYB	“	22,518	97	29	52
WB9BSL	“	5,654	64	26	40
W9YYG	**28**	**111,210**	**363**	**27**	**83**
K9TTE	“	109,723	349	27	86
W9QEE	“	76,505	255	28	79
WA9CYV	“	63,630	206	24	78
W9WCE	“	26,492	125	23	51
K9BUG	“	23,048	122	22	45
K9UQW	“	19,765	109	20	47
K9LQJ/9	“	6,875	48	18	37
WA9ZRP	“	4,719	47	14	25
K9LET	**21**	**40,410**	**190**	**27**	**63**
OH1XO/W9	“	21,000	120	20	50
WA9SMM	“	20,235	105	22	49
WB9BSH	“	1,104	23	11	13
WB9BWU	**14**	**211,200**	**461**	**39**	**126**
W9IOP	“	137,566	347	37	106
WA9UEK	“	1,848	27	10	18
W9NZM	**7**	**19,648**	**129**	**20**	**44**
W9WKU	“	2,210	28	11	23
W9LKJ	**3.8**	**1,632**	**35**	**10**	**14**
W0NGJ	**A**	**136,572**	**246**	**81**	**147**
WA0LMK	“	106,175	250	54	101
WA0OML	“	26,606	111	48	58
W0JYE	“	26,325	89	43	74
W0AIH	“	11,543	63	37	42
W0CNY	“	8,804	96	28	34
W0ERQ	“	8,083	49	25	34
W4UDS/0	“	7,560	53	22	32
W0FWN	“	2,624	30	13	19
WA0HVR	**28**	**79,895**	**300**	**26**	**69**
W0KBG	“	75,810	296	25	70
K0CMF	“	28,800	142	24	51
WA0KDI	“	19,800	99	24	48
K0JPL	“	16,120	97	20	42
WA0LYO	“	7,840	60	18	31
WA0LRQ	“	1,975	28	9	16
WA0RKQ	“	784	17	5	11
WA0CVS	**21**	**98,365**	**340**	**28**	**75**
K0PFV	“	1,056	18	11	13
W0IYH	**14**	**89,394**	**222**	**38**	**103**
WA0ETC	**7**	**8,003**	**67**	**16**	**37**
WA0EPG	“	1,144	21	10	16

Alaska

KL7HCN	**A**	**588,731**	**1610**	**54**	**105**
KL7HDW	**21**	**135**	**7**	**5**	**4**
KL7MF	**14**	**81,697**	**461**	**26**	**47**

Antigua

VP2AAP	**A**	**317,952**	**696**	**70**	**122**

Bermuda

VP9GE	**28**	**78,702**	**440**	**22**	**56**

Canada

VO1CM	**A**	**50,948**	**203**	**24**	**70**
VO1HI	**14**	**140,900**	**541**	**25**	**75**
WB2RLK/VE1	**A**	**745,006**	**1175**	**89**	**185**
VE1EK	“	13,752	85	28	44
VE1AIH	**28**	**64,400**	**262**	**26**	**66**
VE1AM	**14**	**189,333**	**690**	**28**	**81**
VE2AYU	**A**	**477,271**	**693**	**77**	**200**
VE2NV	“	430,900	600	79	199
VE2WA	“	109,260	231	60	120
VE2IZ/VE2	“	82,582	225	53	104
VE2AFC	**21**	**201,426**	**613**	**29**	**89**
VE2AQS	“	54,780	376	21	45
VE2AKZ	**14**	**52,615**	**251**	**27**	**58**
VE3BR	**A**	**19,662**	**88**	**29**	**58**
VE3GCO	**28**	**150,164**	**467**	**26**	**98**
VE3DAV	“	12,078	73	16	45
VE3BMV	**21**	**310,821**	**984**	**30**	**103**
VE3BPQ	**14**	**208,917**	**588**	**37**	**102**
VE3KZ	**3.8**	**13,545**	**154**	**11**	**32**

Enrico, I1GAD a member of the Multi Single team at I1LCK in the past, had to go it alone this year. He won himself a certificate on 28 mc. He promises to get the ole gang together for a multi effort next year.

VE4FU	**A**	**461,668**	**1027**	**75**	**136**
VE4RP	"	126,819	275	75	114
VE4SD	**14**	**22,072**	**166**	**24**	**38**
VE4AA	"	13,390	86	22	43
VE5TO	**A**	**34,347**	**136**	**45**	**62**
VE5NW	**14**	**103,452**	**410**	**31**	**80**
VE6GN	**A**	**452,350**	**927**	**82**	**136**
VE6MC	"	332,860	684	75	112
VE6AP	"	158,110	296	70	124
VE6AGV	"	147,000	429	58	89
VE6AJD	"	113,088	406	57	67
W8ILH/VE6	"	74,400	364	43	50
VE6AQU	"	31,806	239	27	35
VE6AB	"	29,786	128	45	61
VE6TK	"	13,390	74	30	38
VE6ANO	"	9,666	71	23	31
VE6HN	**14**	**115,434**	**461**	**31**	**75**
VE6GQ	"	45,686	153	36	70
VE6PL	"	22,940	126	27	47
VE6VU	"	1,300	20	11	15
VE6AYU	**7**	**3,546**	**106**	**9**	**9**
VE7BDJ	**A**	**1,055,394**	**1494**	**106**	**200**
VE7DG	"	90,000	274	58	86
VE7AZG	"	45,917	267	28	35
VE7BOY	"	18,981	192	23	15
VE7LB	**21**	**499,590**	**1575**	**33**	**89**
VE7CE	"	33,210	247	21	33
VE7SV	**14**	**603,424**	**1426**	**39**	**134**
VE8YE	**A**	**310,680**	**1029**	**57**	**63**
VE8BB	"	166,023	594	52	77
VE8OK	**14**	**152,064**	**481**	**35**	**97**

Canal Zone

KZ5WH	**A**	**430,680**	**1028**	**70**	**124**

Costa Rica

TI2HP	**3.8**	**5,577**	**67**	**10**	**29**

Dominican Rep.

HI3XAM	**A**	**227,238**	**839**	**42**	**79**
HI8LC	**14**	**112,746**	**582**	**25**	**61**

El Salvador

YS2CEN	**14**	**233,750**	**804**	**32**	**93**

Greenland

OX5AP	**A**	**357,112**	**733**	**59**	**137**
OX3WQ	"	238,235	616	46	109

Guatemala

TG9GF	**14**	**207,345**	**810**	**30**	**85**

Honduras

HQ2GK	**A**	**962,559**	**1923**	**77**	**170**
HR2HHP	**28**	**105,200**	**1100**	**19**	**31**

Mexico

XE0QB	**A**	**1,158,099**	**2156**	**84**	**165**
4B1AE	"	874,482	1413	93	180
XE1LLS	"	284,320	861	60	100
XE1HS	**21**	**22,050**	**223**	**17**	**28**
XE1UA	**14**	**289,625**	**1068**	**35**	**90**

Montserrat

VP2MF	**14**	**638,248**	**1977**	**39**	**97**

Nicaragua

HT1MG	**A**	**861,278**	**1655**	**80**	**162**
HT1EAS	28	777	55	4	3

Panama

HP1AS	**A**	**139,518**	**463**	**45**	**93**
HP1JI	**21**	**13,818**	**129**	**16**	**33**
HP1JC	**3.8**	**5,418**	**67**	**12**	**31**

Puerto Rico

WA4UTP/KP4	**A**	**68,096**	**423**	**29**	**40**
KP4DJI	"	49,344	372	29	35
KP4AST	**28**	**630,180**	**2010**	**31**	**104**
KP4DDO	"	293,102	1277	28	73
KP4DEX	**21**	**195,435**	**805**	**28**	**73**
KP4DKX	**7**	**21,846**	**326**	**10**	**23**

Sint Maarten

PJ8AR	**A**	**260,400**	**973**	**46**	**74**

Virgin Islands

KV4FZ	**A**	**4,961,551**	**4362**	**128**	**369**
K4IXG/KV4	"	13,272	151	20	22

AFRICA

Angola

CR6TP	**A**	**25,280**	**112**	**27**	**53**
CR6IK	**14**	**961,625**	**1869**	**38**	**137**
CR6LF	"	235,014	648	33	98

Ascension Is.

ZD8H	**A**	**607,745**	**1061**	**57**	**140**

Cameroun

TJ1AZ	**21**	**198,254**	**583**	**33**	**86**
TJ1AW	**14**	**809,200**	**1577**	**38**	**137**

Canary Islands

EA8GZ	**A**	**478,225**	**695**	**72**	**163**
EA8GK	**28**	**38,976**	**157**	**28**	**59**
EA8FS	**14**	**11,316**	**92**	**13**	**28**

Cape Verde Is.

CR4BV	**21**	**3,842**	**72**	**8**	**9**
CR4BC	**14**	**525,821**	**1196**	**35**	**114**

Dem. Republic of Congo

9Q5GJ	**A**	**69,156**	**232**	**41**	**72**
9Q5RD	**14**	**77,376**	**350**	**25**	**53**

Gabon

TR8DG	**A**	**147,573**	**314**	**63**	**108**

Liberia

EL2CB	**A**	**1,396,720**	**1474**	**90**	**226**
EL2CK	**14**	**379,506**	**1100**	**33**	**85**

Malagasy Rep.

5R8AP	**A**	**48,124**	**174**	**40**	**66**

Morocco

CN8HD	**A**	**131,223**	**474**	**21**	**72**

Mozambique

CR7IK	**28**	**234,876**	**712**	**32**	**79**
CR7CH	**21**	**81,952**	**280**	**32**	**72**
CR7FR	**14**	**203,680**	**533**	**37**	**97**

Rhodesia

ZE3JO	**28**	**17,346**	**128**	**13**	**36**
ZE2JE	**14**	**526,525**	**1189**	**37**	**115**

South Africa

ZS5XA	**A**	**1,368,960**	**1341**	**94**	**216**
ZS6RM	"	48,400	144	52	69
ZS6ACK	**28**	**240,786**	**825**	**30**	**68**
G3LZQ/ZS4	"	212,772	850	27	57

Southwest Africa

ZS3KC	**A**	**209,280**	**595**	**55**	**65**

Tristan da Cunha

ZD9BM	**A**	**68,172**	**249**	**39**	**53**

ASIA

Afghanistan

YA1CV	**A**	**131,664**	**381**	**41**	**78**
YA0CDRC	"	19,588	114	35	48

Ceylon

4S7AB	**A**	**156,305**	**313**	**75**	**140**

Hong Kong

VS6DR	**A**	**2,095,415**	**2594**	**134**	**303**

India

VU2KV	**A**	**716,880**	**1018**	**96**	**194**
VU2CK	"	179,172	433	48	110

Iran

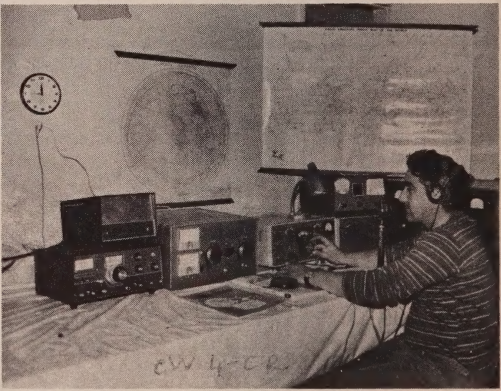
EP2BQ	**A**	**1,799,450**	**1722**	**93**	**272**

Israel

OH1PS/4X	**3.8**	**12,680**	**114**	**8**	**32**

Japan

JA1BK	**A**	**874,164**	**1067**	**100**	**191**
JA1EOD	**A**	**540,912**	**794**	**87**	**149**
JH1QOJ	"	283,100	673	61	88
JA2ACC	"	180,576	302	89	127
JA3EBT	"	164,052	314	77	109
JA3MXG	"	77,172	240	45	73
JA3HTT	"	60,256	195	52	60
JA8BFI	"	43,524	198	38	40
JA2LA	"	42,960	129	52	68
JA2HNP	"	35,763	100	59	72
JA5DDF	"	26,709	114	32	55
JA1JKG	"	24,722	180	21	26
JA1EHA	"	21,082	94	38	45
JA1AAT	"	20,473	78	30	44
JA6EFT	"	16,188	106	23	34
JR1OUU	"	12,017	78	27	34
JA6IYF	"	9,936	70	26	28
JA4FM	"	9,790	65	23	32
JA5IU	"	9,744	62	23	33
JA3DAU	"	8,871	59	22	27
JA3FD	"	6,160	52	19	25
JA1AS	"	5,200	54	20	20
JA7JGD	"	3,410	40	15	16
JA8QA	"	2,850	38	10	15
JA7FFY	"	2,117	27	14	15
JA0EZP	"	793	24	6	7
JA3DGC	**28**	**128,700**	**450**	**32**	**68**
JA9AG	**28**	**123,648**	**495**	**30**	**62**
JH1DMR	"	119,340	413	31	71
JH1FCX	"	93,912	388	30	54
JA1AG	"	23,182	128	26	41
JA2DYI	"	19,176	130	21	30
JA2NNQ	"	14,040	110	20	25
JH1CPH	"	12,690	95	18	27
JA2LXK	"	12,505	107	20	21
JA1FJB	"	10,335	76	23	30
JA0HTT	"	6,688	69	18	20
JA8WY	"	4,932	54	17	19
JA3TS	"	3,472	42	15	16
JA9BKW	"	2,806	42	12	11
JA9BAB	"	1,458	22	11	16



This photo taken exactly one minutes after the end of the Contest, shows Mario ready for slumberland and dreams of the NJDXA Trophy. CW4-CR was not only the Top Single Bander but set a new record on 21 mc.

JA3ELU	"	1,200	18	9	15
JA9BJ	"	735	13	10	11
JA0ANO	"	310	11	5	5
JA4OQ	"	176	8	4	4
JA1RJW	**21**	**343,662**	**1050**	**33**	**94**
JA21JXU	**21**	**101,844**	**423**	**29**	**53**
JA2JAB	"	31,896	160	28	44
JA6BIF	"	18,638	120	29	25
JA0HXH	"	10,656	105	18	18
JA2UJS	"	9,720	82	17	23
JA4HNR	"	9,237	103	21	32
JA6ID	"	5,208	62	12	16
JA1OLT	"	4,692	50	17	17
JA0SC	"	3,894	42	15	18
JA8FDB	"	3,614	50	13	13
JH1NHD	"	2,552	31	14	15
JR1CSZ	"	1,584	30	11	11
JA3ISR	"	1,152	13	6	6
JA0IFL	"	585	16	7	6
JH1DXM	"	570	14	9	10
JH1MRH	"	351	11	8	5
JR1BIC	"	266	10	7	7
JR1CBG	"	225	10	4	5
JA0HJR	"	24	2	2	2
JH1MRS	"	12	2	2	2
JA1KSO	**14**	**340,704**	**767**	**39**	**117**
JA1NAW	"	303,518	704	39	119
JA1OJE	"	89,010	281	35	80
JA8BXC	"	39,771	178	33	48
JA1VZM	"	12,411	77	26	37
JA1ALX	"	5,625	52	19	26
JR1EEU	"	2,790	30	14	17
JA4AQR/5	"	2,211	39	15	18
JA6BCU	"	416	24	6	7
JA3AVO	"	84	4	3	4
JA7JM	**7**	**7,252**	**79**	**17**	**20**
JA2AAQ	"	6,820	58	19	25
JA7DXX	**3.8**	**1,032**	**17**	**6**	**6**

KA9JC	**A**	**367,380**	**748**	**83**	**97**
KA5EE	"	111,874	310	48	83
KA5AF	**14**	**3,664**	**90**	**7**	**9**

Jordan

JY1	**A**	**12,282**	**89**	**20**	**26**

Lebanon

OD5BA	**A**	**408,480**	**769**	**47**	**138**
OD5LX	**21**	**5,886**	**41**	**18**	**36**

Nepal

9N1MM	**A**	**763,600**	**945**	**98**	**234**

Ryukyu Islands

KR6AY	**A**	**967,840**	**1856**	**89**	**174**
KR6JX	"	439,215	1019	88	147

Singapore

9V1PM	**14**	**22,800**	**172**	**26**	**49**

Thailand

HS1ACH	**A**	**138,528**	**469**	**57**	**99**

Turkey

TA3HC	**28**	**129,240**	**621**	**20**	**52**

U.S.S.R.

Asiatic

UW9WR	**A**	**1,132,115**	**1304**	**90**	**233**
UA9OO	"	242,963	457	70	134
UA9MD	**28**	**21,924**	**170**	**17**	**37**
UA9QAA	"	13,717	119	10	33
UK9HAB	"	1,660	33	7	13
UA9TT	**21**	**72,009**	**395**	**17**	**46**
UW9CR	"	17,238	119	14	37
UA9UY	"	13,959	162	15	32
UA9MT	**14**	**9,900**	**70**	**21**	**34**

UA0LZ	**A**	**92,213**	**489**	**54**	**63**
RA0LEH	**28**	**45,832**	**348**	**24**	**44**
RA0UBG	28	28,866	347	17	34
UA0TO	**21**	**89,460**	**846**	**20**	**43**
UA0ABC	"	6,156	43	20	37
UA0DG	**14**	**85,158**	**454**	**34**	**49**
UA0AI	"	45,486	321	27	36

Armenia

UK6GAE	**14**	**126,280**	**422**	**31**	**79**
UG6JJ	"	84,800	335	29	77

Azerbaijan

UD6BN	**14**	**16,072**	**141**	**10**	**31**

Georgia

UF6DD	**14**	**6,206**	**77**	**5**	**24**

Kazakh

UL7YR	**A**	**44,073**	**224**	**25**	**58**

Kirghiz

UM8MAA	**28**	**32,144**	**344**	**14**	**35**
UM8FM	**14**	**11,342**	**84**	**18**	**35**

Tadjik

RJ8JBR	**28**	**148,694**	**703**	**26**	**65**
UJ8AC	**14**	**50,700**	**275**	**25**	**53**

Turkoman

UH8BO	**A**	**146,000**	**328**	**64**	**116**

EUROPE

Aland Island

OH0NI	**A**	**133,570**	**576**	**54**	**131**

Balearic Islands

EA6BM	**A**	**19,313**	**236**	**9**	**22**

Belgium

ON5GQ	**A**	**755,585**	**904**	**101**	**248**
ON4XG	"	259,210	504	74	156
ON4SZ	**28**	**259,868**	**715**	**32**	**96**
ON5KY	**21**	**449,826**	**1117**	**37**	**109**
ON8CG	"	138,533	540	31	78

Bulgaria

LZ1XA	**28**	**218,929**	**1000**	**28**	**69**
LZ1BM	"	5,250	81	13	29
LZ2EE	**21**	**124,070**	**812**	**26**	**69**

OA4LM turned in one of the top all band scores from South America. There's a lot of talent down there but Klaus was only one of a few who put it to work.

TOP U.S.A. SCORES

Single Operator

All Band	**W6RR**	**1,837,620**
28 mc	W2YT	212,725
21 mc	W1RIL	346,495
14 mc	W4AXE	595,725
7 mc	K2GXI	44,978
3.8 mc	K3UZE	18,054
1.8 mc	WA4SGF	132

Multi-Operator

Single Trans	WB2SQN	1,914,349
Multi Trans	W3AU	5,741,523

Channel Is. (Guernsey)

GC3YIZ	**28**	**54,944**	**303**	**22**	**46**

Czechoslovakia

OK3EE	**A**	**183,280**	**558**	**69**	**163**
OK1ADM	"	155,344	240	84	182
OK2KR	"	152,250	448	57	153
OK3DG	"	131,603	417	62	127
OK1MP	"	75,050	274	58	132
OK1XW	"	41,118	202	39	115
OK2QR	"	28,980	140	32	52
OK1ADP	"	25,088	84	43	69
OK3EA	"	9,966	138	17	49
OK1ATX	"	6,344	76	18	43
OK1TA	"	4,750	45	18	32
OK1AGQ	**28**	**63,063**	**290**	**28**	**49**
OK2ABU	"	15,453	117	18	33
OK2BEN	"	3,266	50	11	12
OK1BY	**14**	**102,026**	**394**	**34**	**105**
OK1MG	"	54,290	270	32	90
OK2XA	"	35,035	245	29	62
OK2BLI	**3.8**	**6,786**	**164**	**7**	**32**
OK2PDT	"	80	10	2	6

Denmark

OZ1LO	**A**	**1,168,440**	**1301**	**112**	**278**
OZ5KF	"	549,882	996	91	215
OZ3KE	"	65,100	205	50	105
OZ3CE	"	51,620	335	38	78
OZ7DX	"	30,128	124	42	70
OZ3PO	"	25,376	125	37	85
OZ7JZ	"	21,054	128	21	66
OZ5JK	"	14,346	102	18	36
OZ5FT	"	8,448	52	25	39
OZ6UC	"	7,128	103	16	28
OZ4IA	"	4,608	32	18	30
OZ6EI	"	2,812	52	16	22
OZ3SK	**21**	**145,288**	**521**	**31**	**73**
OZ8EA	"	78,376	349	28	64
OZ8MG	**14**	**11,656**	**146**	**12**	**35**
OZ8PG	"	4,727	63	9	23
OZ5KD	"	1,155	22	8	13

England

G3LNS	**A**	**1,667,385**	**1590**	**112**	**293**
G3KMA	"	312,309	615	74	195
G3YHB	"	300,752	625	70	164
G3YBH	"	205,313	505	57	122
G2AJB	"	69,768	311	40	113
G3WOU	"	20,160	136	30	66
G3YBM	**28**	**293,328**	**918**	**30**	**82**
G3WJN	"	266,112	844	29	83
G2BOZ	"	251,086	795	29	84
G3FXB	**14**	**361,534**	**901**	**35**	**128**
G4JZ	"	243,294	847	32	106
G3KWK	"	165,977	562	33	98
G3NSY	"	52,724	359	28	70

Finland

OH7RM	**A**	**128,992**	**605**	**42**	**97**
OH1VA	"	59,346	262	47	110
OH5YF	"	32,832	126	45	69
OH2BJY	"	22,176	195	30	58
OH3JR	"	18,500	125	32	68
OH8RW	"	9,605	56	38	47
OH2VZ	"	4,512	54	14	33
OI3TY	"	4,108	30	22	30
OH5PA	"	2,128	71	17	21
OH2LU	"	1,550	37	11	20
OH1LU	"	1,148	37	7	21
OH2FS	**28**	**32,192**	**176**	**26**	**52**
OH6RH	"	31,476	156	26	60
OH2XA	"	31,096	149	28	64
OH3KW	"	27,264	148	18	53
OH1XA	"	54	3	3	3
OH3TM	**21**	**97,242**	**402**	**32**	**82**
OH2BR	"	14,850	73	28	62
OH6ZJ	"	9,702	145	13	36
OH2TJ/3	**14**	**216,300**	**820**	**34**	**116**
OH2CP	"	136,998	614	35	94
OH5VT	"	125,268	416	36	110
OH8OA	"	7,257	59	22	37
OH7OO	"	6,042	131	11	27
OH9QR	"	5,904	116	11	30
OH2BDX	"	2,156	73	8	20
OH3KD	"	192	8	5	7
OH2BHZ	"	121	9	3	8
OH3MM	**3.8**	**1,584**	**65**	**5**	**17**

France

F2SI	**A**	**1,272,328**	**1643**	**83**	**215**
F9GL	"	232,606	425	71	147
F9RM	"	139,708	377	53	159
F9EW	"	116,616	304	57	115
F6API	"	70,092	293	42	90
F8TQ	"	67,539	224	44	82
F8NI	"	34,884	139	42	72
F3IJ	"	30,888	201	26	40
F5YJ	"	27,846	163	36	81
F6ACV	"	12,920	84	22	54
F2MO	"	8,325	45	32	43
F9WJ	**21**	**3,300**	**50**	**12**	**18**

Germany

DJ6QT	**A**	**1,982,435**	**1691**	**121**	**334**
DJ2YA	**A**	**1,663,440**	**1441**	**120**	**315**
DL3XO	**A**	**1,277,640**	**1306**	**106**	**272**
DL7AA	"	917,815	991	105	242
DJ4ZR	"	642,402	957	81	186
DL8YR	"	609,930	992	83	168
DL0DC	"	534,234	796	84	185
DJ6TK	"	503,398	737	83	204
DL1MD	"	410,786	628	87	206
DL8FR	"	361,788	640	77	142
DJ9IA	"	277,830	563	74	171
DJ2GG	"	256,230	468	81	153
DJ8UV	"	250,425	484	75	190
DJ4UF	"	173,826	379	60	114
DJ3HT	"	173,635	396	68	137
DJ2YE	"	173,460	360	64	146
DJ2RB	"	153,608	446	64	147
DJ9ZB	"	147,186	332	70	151
DK4PI	"	109,298	287	73	138
DJ8OT	"	100,326	307	48	90
DJ2UU	"	84,488	233	62	117
DL2AD	"	58,552	226	39	65
DK3SN	"	42,568	177	38	98
DJ1TS	"	26,208	144	35	61
DL1KC	"	13,320	72	30	60
DL8MY	"	13,248	89	26	46
DK1YK	"	9,471	92	26	51
DL2OR	"	8,532	69	21	33
DK4QD	"	6,825	41	28	37
DK5EF	"	5,734	80	19	28
DL1YB	"	1,484	51	6	22
DL6EN	**28**	**374,875**	**1235**	**36**	**89**

LZ1XA won the 28 mc certificate for Bulgaria with this neat lay-out. We expect big and better things from Tony next year.

DJ5JH	"	41,322	158	29	68
DJ1XC	"	40,090	163	27	68
DL1KS	"	31,410	124	31	59
DL9JL	"	9,724	91	18	26
DL0HM	21	35,073	166	28	53
DL9YC	"	17,250	98	26	43
DL8NU	14	608,760	1279	38	152
DL9EY	"	2,220	60	7	23
DJ6LV	7	7,797	129	13	40
DK3RV	"	2,494	90	5	24
DL8PC	3.8	17,052	252	11	47
DL5JF	A	1,308,236	1359	114	274
DL4RM	"	475,915	966	64	123
DL4WL	"	6,566	84	16	23
DM2CEK	A	178,904	501	58	156
DM2BTO	"	87,360	310	56	139
DM3OML	"	17,009	173	15	58
DM2AYK	"	4,108	29	24	28
DM3BE	"	54	5	4	5
DM2FDL	14	1,290	31	7	23
DM6MAO	"	1,204	27	9	19
DM2CXN	7	136	17	2	6
DM2AJH	3.8	1,508	60	3	23

Hungary

HA9OU	A	20,584	150	31	52
HA6NI	"	1,856	50	12	20
HA6NA	21	10,088	111	15	37
HA7LF	14	55,575	449	25	70
HA5KHC	"	320	18	4	12

Iceland

WB6PB/TF	A	57,159	414	26	61
K2LQQ TF2	14	102,212	604	27	65
TF3OJ	"	16,818	170	15	32

Italy

I1FLD	A	1,224,000	1397	100	240
I1BAF	"	1,094,823	1143	112	275
I1GAD	28	140,595	538	30	61
I1DAB	"	118,664	451	30	61
I1ZTI	"	107,856	462	28	56
I1ARC	"	45,218	360	17	29
I1PLN	21	106,603	483	28	69
I1MAU	14	267,720	865	35	103
I1PRK	"	246,560	764	36	124
I1BQI	"	121,412	544	32	95
I1CZQ	"	116,487	456	32	97
I1TTL	"	41,370	232	28	77
I1AIM	7	53,295	350	25	70
I1LCK	"	25,488	259	15	57
I1AMD	"	10,314	197	14	40

I.T.U.

4U1ITU	A	692,490	1179	68	178

Liechtenstein

HB0XKZ	1.8	996	85	2	10

Netherlands

PA0UC	A	40,112	161	38	71
PA0TO	"	17,688	142	25	42
PA0DEC	"	5,529	48	20	37
PA0VB	"	5,330	63	20	21
PA0JPC	"	2,496	69	9	23
PA0EEM	14	96,655	445	31	92
PA0LVK	"	7,280	102	13	39
PA0MIR	3.8	6,552	165	6	33
PA0PN	1.8	320	32	2	8

Northern Ireland

GI3RXV	28	300,580	981	31	82

Norway

LA6GF	A	252,984	439	78	121
LA3SG	"	193,130	488	60	157
LA8OM	"	77,390	345	46	96
LA5QK	"	55,580	246	44	96
LA2GN	"	20,254	232	20	72
LA3LC	"	9,715	101	26	41
LA3HM	"	9,576	77	26	50
LA1LK	"	7,803	110	16	35
LA5KO	"	7,770	93	21	49
LA8UM	"	5,850	65	17	33
LA7RB	"	4,318	74	12	30
LA5F	"	2,340	47	11	28
LA8HF	"	323	9	8	9
LA9M	"	153	17	2	7
LA5UJ	21	7,074	64	16	38
LA4ZB	"	1,333	23	12	19
LA6XI	"	300	8	7	8
LA8M	14	61,659	333	29	64
LA7ZN	"	2,072	64	7	21
LA6U	7	270	17	3	12
LA0AD	3.8	80,754	757	20	66

Poland

SP5CIC	A	612,080	936	86	194
SP9KR	"	43,549	345	26	81
SP2BMM	"	26,325	177	36	81
SP8AWP	"	10,878	120	18	56
SP5XM	21	27,307	149	27	56
SP5AKG	14	208,640	606	35	128
SP5BSV	"	18,905	104	24	71
SP7ASZ	"	9,836	130	13	34
SP9PT	"	6,386	70	16	46
SP9ABU	"	5,805	109	12	33
SP5AZQ	"	2,664	59	9	27
SP5CJU	"	2,310	53	11	22
SP1BLE	"	1,960	56	8	20
SP5BB	"	1,711	50	9	20
SP9ADU	"	924	36	7	14
SP6BQF	3.8	10,665	230	7	38
SP6BQF	3.8	10,665	230	7	38
SP5KGT	"	5,049	153	5	28
SP5DZI	"	3,360	111	4	28
SP6PAZ	"	429	36	2	11
SP9ZAF	"	375	27	3	12

Portugal

CT1BH	A	1,131,600	1408	87	213
CT1LN	"	449,085	869	75	198
CT1QN	"	368,232	761	70	198
CT1WA	28	112,266	494	23	58
CT1SH	14	3,813	53	14	27
CT1GD	7	8,413	154	12	35

Romania

YO2AFB	A	54,671	316	35	86
YO6ALD	"	3,480	80	10	30
YO3AID	14	1,575	25	5	16
YO3YZ	"	459	25	4	13

Scotland

GM3BCL	A	202,852	491	57	131
GM3VEY	14	23,214	210	20	53
GM3WOJ	7	1,560	57	6	20
GM3VTB	3.8	9,460	195	7	37
GM3YCB	1.8	1,204	87	2	12

Spain

EA7HZ	A	18,286	141	25	57
EA4LH	3.8	54,270	422	19	62

Sweden

SM5CEU	A	768,208	1027	97	207
SM7WT	"	566,595	624	105	300
SM7TV	"	344,623	609	77	174
SM5DJZ	"	279,296	570	71	185
SM7ID	"	110,400	390	48	136
SM3AXV/3	"	59,736	256	41	90
SM5CAK	"	56,511	254	33	84
SM0BDS	"	53,940	263	44	101
SM7DQC	"	20,688	206	25	56
SM5CSS	"	12,792	102	18	34
SM5BMB	"	7,031	57	29	50
SM7EVM	"	5,270	62	15	16
SM7BGF	"	4,644	86	17	26
SM4AWG	"	880	28	6	14
SM6AEK	28	272,961	805	32	85
SM5GZ	"	117,534	397	29	85
SM0CXM	"	7,850	59	20	30
SM7DMN	"	3,420	42	14	22
SM5API	21	391,095	1166	35	100
SM6CWK	"	389,672	1078	35	99
SM7ABL	"	19,684	100	28	46
SM6CRA	"	17,150	91	24	46
SM6CVE	14	8,400	136	13	37
SM4CGM	"	2,730	35	13	29
SM5GA	"	1,456	28	12	14
SM6CDG	"	816	28	8	16
SM0AJU	7	9,320	120	14	46
SM5DSG	3.8	24,461	351	14	47
SM6CKU	"	14,478	200	12	45

Switzerland

HB9ZY	A	1,368,454	1234	107	312
HB9UD	"	91,784	261	51	98
HB9IX	"	22,960	170	24	58
HB9AGH	28	9,792	83	18	33
HB9AEB	21	101,007	429	27	60
HB9DX	"	26,910	116	28	26

Wales

GW3NWV	A	167,240	443	46	102

Yugoslavia

YU4VFC	A	368,480	832	69	176
YU3EY	28	262,460	835	31	79
YT2RBI	"	29,337	152	27	50
YU3TXT	21	4,945	75	13	30
YT2CB/X	14	64,050	500	27	78
YT2REY	7	3,822	78	10	32
YU3TST	3.8	4,752	128	6	30

U.S.S.R.

European

UA1DZ	A	1,222,363	1454	112	285
UW6LC	"	192,879	427	76	185
UV3FD	"	167,688	439	60	144
UA3FU	"	120,555	443	50	91
UW3NG	"	10,772	86	24	39
UA3HB	"	8,910	55	25	41
UA1DU	"	7,810	98	17	38
UV3MM	"	7,680	59	21	43
UA3GM	"	3,397	67	11	32
RA3ACQ	28	155,288	634	31	87
UA4CZ	"	127,236	615	29	63
UA3OG	"	70,168	302	32	66
UA4QX	"	43,774	297	27	59
UA6JWW	"	42,504	372	21	56
UA3AAO	"	23,639	151	25	52
UW3UH	"	14,755	107	22	43
RA3LAA	"	14,000	132	18	38
UA1JA	"	6,750	74	20	30
UA4CO	"	4,182	56	12	29
RA3ABR	"	1,568	23	11	17
RA6ABS	"	1,440	23	11	17
UK4YZZ	21	337,280	1154	36	88
UA1WW	21	137,814	583	26	77
UW3EH	"	104,100	536	29	71
UW1BM	"	49,140	372	24	60
UA1CS	14	169,051	580	37	102
UC4IK	"	146,673	574	34	95
UA4PW	"	96,894	427	33	83
UW3HY	"	25,840	192	24	56
UW1OP	"	8,260	62	22	37
UA4RO	"	4,050	63	13	32
UK1ABC	"	1,012	36	6	17
UA3SU	"	200	9	5	5
UW3IS	3.8	10,783	241	8	33
UA3YAE	"	48	6	3	5

Estonia

UR2AO	A	99,036	315	58	131
UR2ED	28	19,667	138	23	48
UR2IV	"	7,975	62	21	34
UK2RAT	14	17,700	247	16	43
UR2GZ	"	9,204	86	16	43
UR7EK	7	15,624	215	16	46
UR2FQ	3.8	7,400	182	7	33
UR2QB	"	2,574	69	7	26
UR2QD	"	2,552	88	5	24
UR2MG	"	1,950	72	4	22

Latvia

UQ2IL	A	59,898	335	35	99
UQ2DV	"	16,770	166	23	63
UQ2NW	14	158,670	882	33	96
UQ2PO	3,8	1,936	71	3	19
UQ2CR	"	413	25	6	13

Lithuania

UP2CV	A	56,723	303	33	98
UP2CL	"	42,048	361	23	73
UP2PAD	28	138,424	494	25	79
UP2PD	"	2,952	39	13	23
RP2PBF	"	1,856	34	7	22
UP2OE	3.8	4,000	123	5	27

Moldavia

UO5BZ	A	29,370	191	31	79
UO5BS	3.8	5,820	182	7	23

White Russia

UC2WE	A	186,850	735	55	130
UC2DN	28	29,574	151	26	53
RC2WAQ	"	12,296	117	18	35
UK2AAB	21	1,653	33	13	16

Ukraine

UY5LK	A	768,580	1237	90	212
UT5AM	"	343,266	662	70	161
UT5FN	"	89,612	361	49	123
UT5LY	"	16,872	187	19	55
UB5VL	"	4,116	87	12	30
UK5IBM	28	88,478	447	24	59
UY5HB	"	74,575	422	26	69
RB5EDU	"	56,320	329	26	62
RB5VAS	"	35,422	164	28	61
UY5EM	"	32,116	210	24	50
UB5OF	"	16,000	174	20	44
RB5QAO	"	18,810	227	14	43
UY5HG	"	3,100	72	10	21
UB5EM	21	38,619	375	19	44
UK5EAQ	14	118,236	565	31	87
UT5LE	"	77,160	359	31	89
UB5SJ	"	76,372	346	31	91
UK5FAD	"	51,243	374	30	63
UB5JK	"	6,450	81	14	36
UT5WW	"	4,429	47	13	30
UB5FG	7	8,924	177	10	36

OCEANIA

Adelie Land (Antarctica)

FB8YY	A	51,750	250	27	42

Australia

AX1BC	A	60,634	188	47	75
AX2WD	28	34,776	255	20	26
AX2WC	21	119,340	510	26	52
AX2APK	14	607,128	1281	37	127

AX3SM	A	16,472	62	33	38
AX3QV	28	10,741	157	11	12
AX3ASV	21	4,263	73	9	12
AX3ARV	14	3,036	44	11	12
AX4FH	A	137,080	398	50	65
AX4DO	14	33,858	153	29	52
AX5LC	28	5,820	78	15	5
AX6HD	A	2,181,240	2071	115	245
AX6RU	''	1,121,952	1136	111	237

Caroline Is. (East)

KC6RS	A	966,288	1516	82	137

Caroline Is. (West)

KC6WS	14	364,818	1073	34	89

Guam

W3CHH/KG6	A	46,995	256	30	35
KG6AQY	21	749,529	2353	32	72
KG6ASP	21	247,968	1162	25	47

Hawaii

KH6RS	A	3,595,049	3493	123	226
KH6GMP	28	454,181	1697	32	59
KH6FQB	''	14,624	169	14	18
KH6BZF	21	603,512	2214	33	58
KH6IJ	''	516,061	2006	31	60
W4FAY/KH6	14	41,120	195	28	52
KH6GLU	7	64,437	475	17	30

New Zealand

ZM1AJU	A	1,280,785	1406	106	213
ZM1TB	''	5,240	44	17	23
ZM1AAS	21	165,385	591	30	67
ZM4BO	14	527,288	1239	37	115
ZM1BKL	''	205,920	561	33	99
ZM2AH	''	83,398	318	32	66
ZM3RT	''	2,028	26	13	13
ZL1AGO	7	21,825	171	18	27

Samoa (American)

KS6DH	A	1,742,520	2327	102	158

Tahiti

FO8BJ	A	11,913	124	16	17

SOUTH AMERICA

Antarctica

LU1ZE	A	285,660	710	43	95
KC5USL	14	14,700	183	12	18

Argentina

LU5AQ	A	607,714	925	72	154
LU7MAY	''	575,883	840	86	145
LU2FAO	''	498,180	819	80	150
LU7DGM	''	386,686	671	86	140
LU4MBI	''	182,560	484	50	90
LU6AX	''	3,822	37	21	28
LU5FEH	28	307,700	1042	27	73
LU3FAN	14	318,389	863	34	93

Bolivia

CP6EL	A	700,581	1109	65	154
CP5FP	21	64,940	339	24	44
CP5AK	21	9,030	80	17	25
CP1GF	14	208,196	581	34	90

Brazil

PY1DEF	A	95,580	318	31	77
PY2BCQ	''	90,948	249	44	88
PY4ABH	''	61,600	159	57	83
PY2DHM	''	55,100	208	30	65
PY3APH	''	47,411	177	38	61
PY2PH	''	1,674	20	13	18
PY2ETK	28	23,976	159	20	34
PY4KL	21	26,112	139	21	47
PY4OD	14	817,005	1778	38	117
PY4AP	''	413,444	869	37	127
PY3AHJ	''	302,214	993	35	79
PY2BZD	''	24,319	115	29	54
PY7BFN	7	28,168	175	17	39
PY3CGP	''	2,436	37	13	15
PY1CHP	''	462	15	8	6

Chile

CE6BJ	A	52,345	211	40	55
CE5FQ	28	171,948	670	26	63
CE8AO	''	82,336	632	26	57
CE6EZ	14	680,798	1549	36	110
CE3OE	''	189,501	590	34	79

Columbia

HK4DF	A	1,102,850	1325	91	183
HK6BRK	7	6,156	68	8	28

Easter Island

CE0AE	28	910	24	7	6

Fernando de Noronha Is.

PY0AD	A	49,725	202	27	58

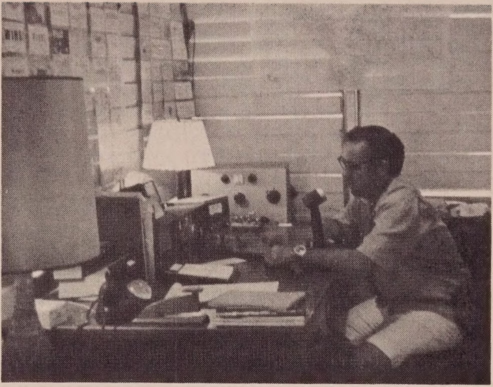
Paraguay

ZP5GS	A	541,650	829	76	154
ZP9AC	''	9,964	188	21	32
ZP5PD	14	54,230	229	29	56

Peru

OA4LM	A	1,221,640	1547	90	190
OA4V	''	878,748	1166	95	163
OA4YW	''	169,740	510	37	78
OA4CCN	''	29,859	119	40	71
OA4LA	21	105,448	377	29	69
OA3Y	''	13,110	128	12	36
OA3X	''	2,950	44	8	17

This shot of KS6DH must have been taken before the Contest. Jerry could never have looked that relaxed after putting in a tough week-end that placed him in the Top Ten among the all-banders.



Another good catch in the Pacific. Russ thinks he learned a lot in his first major attempt and expects to place KC6RS in the top group next year.

Suriname

PZ1AH	A	2,471,558	2201	105	281
PZ1CU	''	440,066	641	74	167
PZ1BK	''	29,280	162	23	38

Trinidad

9Y4VV	14	102,887	489	26	63

Uruguay

CX9CO	A	873,234	1003	103	206
CW4CR	21	1,196,085	2462	39	126
CX1JM	''	543,630	1352	37	99
CW3BH	14	594,659	1392	38	111

Venezuela

YV1YC	A	500,808	1014	50	118
YV5AK	''	39,644	130	40	66
YV1TP	28	505,455	1971	25	68
4M4CDK	''	504,160	1440	27	88
YV2IF	''	117,576	433	28	64
YV4GD	21	164,640	474	32	88
YV1LA	14	1,012,000	2162	35	125
4M5AXT	''	882,260	1930	37	118
YV5CVE/4		344,348	683	33	91
YV1EJ	''	46,452	198	28	56
YV1BI	7	142,496	660	20	53
YV4UA	3.8	16,340	156	11	27

MULTI-OPERATOR
Single Transmitter

NORTH AMERICA

U.S.A.

W1MX	151,940	255	62	152
WA1LPJ/1	20,475	198	43	78
WB2SQN	1,914,349	1425	131	378
K2UQT/2	920,568	913	107	256
K2BK	476,700	566	86	214
K2OQJ	95,000	213	47	105
W3WQD	1,443,030	1083	125	342
K3JYZ	398,592	552	78	183
WA3JZR	356,934	445	85	218
W4QBK	1,242,752	961	117	331
W4FDA	684,684	720	96	246
WA4UFW	447,579	590	87	210
W4JD	363,000	465	79	196
K4CEF	272,468	387	77	182
W4ATC	207,669	354	69	162
WB4DQM	77,198	229	37	84
W4RSS	20,678	119	41	57
K5FIQ	194,392	408	73	115
W6MAV	1,182,474	1168	119	239
WA6GLD/6	1,167,360	1075	122	262
K6CQF/6	1,140,525	1202	113	202
K6AN	861,470	965	105	206
WB6CQY	511,520	843	104	174
WB6SMG	415,104	549	98	178
WB6HDH	405,108	592	91	151
WB6TSX	76,734	356	39	48
W6OL	6,045	57	17	22
VE7AZT/W7	323,778	648	70	112
WA7NOQ/7	159,477	384	66	93
K8UDJ	600,100	632	98	255
W8BVF	563,992	615	94	225
W8SH	457,470	549	88	211
W8CFG	355,782	437	85	216
WA8ZCO	181,662	313	74	147
W8CUL	100,196	245	45	103
K9PPJ	699,894	731	106	245
G3PAC/W9	581,889	608	110	253
K9CUY	493,086	549	101	240
W9YB	107,970	224	70	113
W0MYN	795,048	891	103	211
W0HP	600,552	614	119	259
WA0TJJ	283,230	415	88	182
W0GGC	270,047	411	90	143
WA0QIT	18,270	85	34	53

Alaska

KL7AIZ	426,344	1310	61	76

Anguilla

VP2EE	3,217,200	3537	110	290

British Honduras

VP1WMU	2,646,540	3170	107	270

British Virgin Is.

VP2VP	3,008,356	3167	105	279

Canada

VE1ACU	295,952	553	63	149
VE2UN/2	1,381,800	1437	102	274
VE3ESM	637,436	898	93	199
VE6LB/6	116,522	544	37	61
VE6ARD	90,937	571	38	39

Canal Zone

KZ5NG	1,434,160	1541	90	195

Haiti

HH9DL	3,302,640	4138	97	263

Puerto Rico

KP4DCR	385,200	1176	48	102

[Continued on page 92]

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vibrator power supply .... **$138.**
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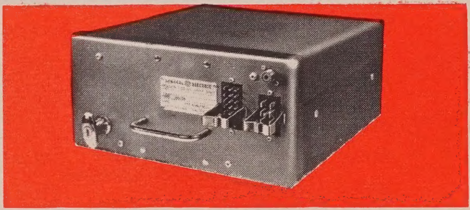
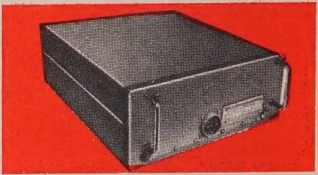
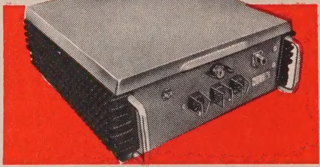


Motorola 450–470 MHz
T44–A6 or A6A .... **$28.**
available only with accessories.

Motorola T44AAV – 450–470 MHz 6/12 volt, 15 to 18 watt,
complete accessories .... **$48.**
With private line minus reeds .... **$78.**



R.C.A. CMC60 B 6/12 volt, 60 watts, 150—170 MHz receiver has vibrator, transmitter, dynamotor power supply, with accessories. .... **$68.**



CMCT 30—12 volt, 30 watt, 148—172 MHz transistorized power supply, fully narrow band with accessories .... **$168.**

CMCT 60, 12 volt, 60 watt, 148—174 MHz transistorized power supply, fully narrow band with accessories .... **$208.**

RCA ovens new, 12 v. & 6/12 volt. .... **$3.**
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F.M.

BY GLEN E. ZOOK,* K9STH/5

ONE of the problems facing the new repeater group is what frequency pair to choose for operation. Most areas have agreed upon the 600 kc input/output spacing, but other areas have different combinations. Also, not everyone in any given area knows all operating repeaters including open and closed. Thus, there is a definite need for a coordinating body to keep repeaters from stepping upon each other. Several groups are now in existance. These include the California Amateur Relay Council (c/o Les Cobb, W6TEE, 4124 Pasadena Avenue, Sacramento, California 95821), the Northeast FM Repeater Association (18 Mary Avenue, Fords, New Jersey 08863), South Eastern Repeater Association (c/o Brevard Repeater Association, Inc. P.O. Box 82, Palm Bay, Florida 32901), and the North Texas Repeater Association (c/o Byron Harrison, K5AIT, 133 W. Cober, Grand Prairie, Texas 75050). Undoubtedly there are many such organizations comprized of representatives from various repeater organizations. I would like to hear from each group to formulate a list for publication in a future column.

The function of coordinating bodies is primarily two-fold: The first is to provide a central listing of frequencies used by each repeater, including link and control frequencies (which are not for general publication); the second is to provide a neutral ground to work out problems and to exchange ideas and information. When organizing such a group it is best to limit participation to a set number of representatives from each member organization. Also, each organization should have only one vote. This insures equal representation regardless of size.

Mini-Review

The mini-review this month is the Cush-Craft DX-120 20 element collinear for 2 meters. Although designed originally for horizontal polarization, it is a relatively simple matter to flip the DX-120 90° for vertical polarization, thus providing an excellent f.m. DX antenna. The basic construction of the DX-120 is excellent. Many improvements have been made over the older 16 element model in terms of strength and durability. Another major difference in the DX-120 is that the feed impedance is approximately 50 ohms, rather than the 300 ohms found in the CL-116. Although the impedance is theoretically balanced, the antenna functioned well without a 1:1 balun. For the purists a 1:1 balun is available from Cush-Craft or can be fabricated from instructions in various handbooks.

Assembly took about 1 hour. Complicating this was the fact that the Post Office Department struck again, and the package was shredded. Although no hardware was lost, it was scattered all over the box. No difficulty was experienced in the actual assembly.

The DX-120 was then installed on the tower with about 50 feet of RG213/U (similar to RG8/U but non-contaminating) coax. Since the shack is located on the second floor, the feedline run required in my installation is relatively short. Checking on receiving it was found that the antenna has three forward lobes. The major lobe was quite definite, but there was sufficient energy on lobes to either side for about 3 db or so of gain over the groundplane reference. This is not unusual for a vertically polarized antenna. A 10 element yagi exhibits several minor lobes when used in the vertical plane. Performance was excellent. Point-to-point contacts over a 75 mile or greater path were easily possible. Also, with the improved front-to-back ratio of the DX-120 it is possible to null out the extremely strong Ft. Worth repeater to work direct on 146.94 mc. This is quite exceptional, for it is difficult to override the repeater for any distance greater than a mile in this locality (about 40 miles from repeater!). Receiving was better than with a 10 element yagi at the same height. This is probably due to the increased "capture area" of the DX-120. All tests were made on a short tower with the antenna about 20 feet above ground. At greater heights the antenna should perform even better.

It is quite difficult to keep emotions out of an antenna review, for I personally favor the collinear type of antenna. However, there are certain handicaps which must be overcome where this type of antenna is used. Not small among these problems is size. The antenna is approximately 6′ × 10′ and is quite a sight to behold. However, if one can overlook the shaking heads of the neighbors and of one's wife, the collinear is worth considering for serious DX and point-to-point work. It is not a good local antenna because of the directivity. Another point in favor of the collinear is the wide frequency response. Such an antenna exhibits a low s.w.r. over the entire 2 meter band. This is difficult to achieve with a yagi of the same gain.

The DX-120 is manufactured by Cush-Craft, 621 Hayward Street, Manchester, N.H. 03103, and is available from many amateur dis-

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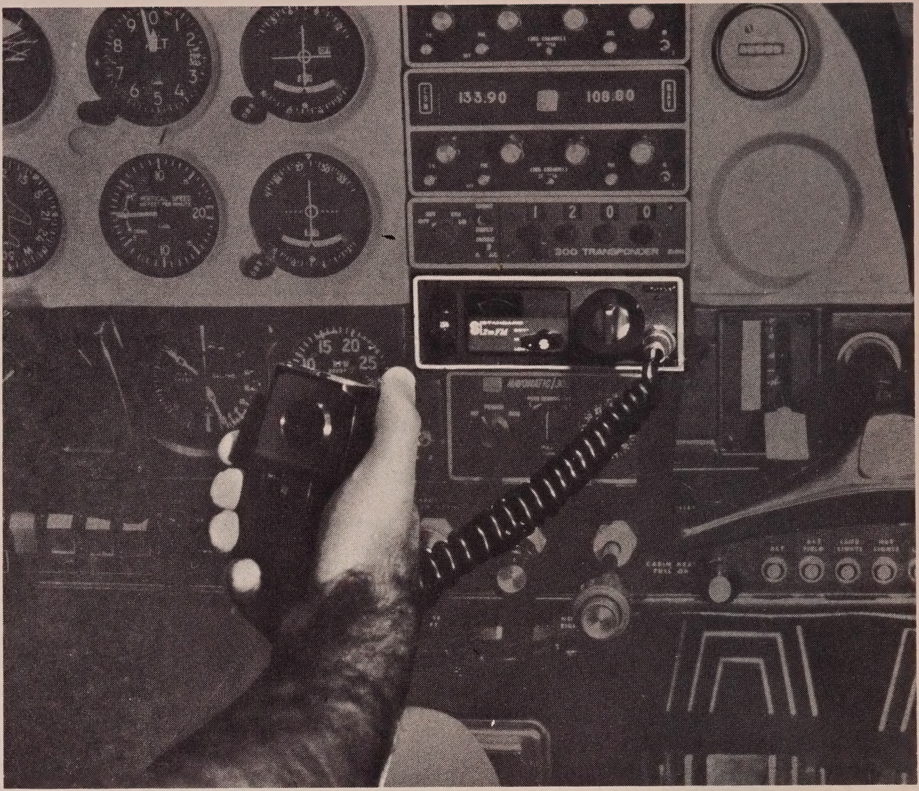
*818 Brentwood Lane, Richardson, Texas 75080



Standard's New High Flying "826"

Standard Communications, the world's largest manufacturer of VHF marine equipment, has developed a professional quality VHF/FM 2 meter transceiver especially for amateur use. The "826" is so compact that it makes mobile installations practical in almost any airplane, boat or car, and it becomes fully portable with Standard's battery pack. When used in conjunction with the AC power accessory, it also makes an ideal, low cost base station unit. Enjoy the fun of amateur radio communication wherever you go for just $339.95.

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Technical Talk

This Technical Talk is a continuation of setting up a good f.m. test bench. The June column carried a construction article on building a dummy-load and a 12 v.d.c. source. Last month's talk had a construction article on building a suitable 50 ohm pad for use with signal generators. Also, the July column began a discription as to what to acquire and the reasons for the acquisition. The following items were described last month: v.o.m., dummy load, signal generator, and test sets. This month finishes out the basic acquisitions with frequency standard, oscilloscope, audio oscillator, and universal control head.

A good frequency standard is a must for accurate f.m. work. Of course most amateurs cannot afford a Cushman CE3 or one of Motorola's new Service Monitors. Thus, other sources must be looked at. Once in a while the older Gertsch FM-7, FM-3, series can be purchased. These units are still legal on low-band, and therefore find buyers in the commercial market. However, they do come around, so pick one up if you can. The surplus market offers possibilities. The TS-323, TS-174, TS-175, and similar v.h.f./u.h.f. frequency meters (similar to familiar BC-221 in appearance) will often suit the needs of the amateur f.m.'er. Also, it is possible to heterodyne the old BC-221 up to six or two meters and use it as a standard.[1] Another frequency standard which has become popular is a crystal standard with a multi-vibrator. When zero-beated to WWV and then subdivided, the output from this standard is quite accurate and usable at two meters and higher. Since the two meter channels are 30 kc apart, and since each is divisible by 30 kc, a 3 mc crystal is used and divided twice by 10 to give 30 kc markers. The same can be done for six and ten meters by using a 2 mc crystal. A commercial source of such an item is Pep Corp., 404 E. Harrison, Royal Oak, Michigan 48067.

The next item on the list is the oscilloscope. If a choice between a d.c. and an a.c. coupled scope is available, choose the d.c. scope. However, this is usually not at hand. Basically, the older under $100 scopes will do nicely. An oscilloscope can help locate audio troubles which would take hours with any other means; it can be used in conjunction with a receiver to read deviation (see last month's Technical Talk); and it can be used when working with tone encoders and decoders. Of course there are many other uses around the shop for a 'scope, so acquire one if possible.

The seventh item on the list is an audio generator. With the rising popularity of tone encoding, such a generator becomes a must when building or aligning tone encoders and decoders. Also, when used with a scope the audio generator is very useful in locating audio distortion and other problems. Of course the better the generator the better it is. Again, most amateurs cannot justify the expense of a Hewlett-Packard 200CD or similar unit. The close calibration of the expensive units is nice, but amateur f.m.'ers can usually get along with less expensive units. Heath, Knight, and many others have made audio oscillators which do a suitable job. The older Jackson units are not too pretty, but also do an excellent job. There is one of the old Jackson's in the photo published with last month's Technical Talk.

The final item in setting up a basic f.m. bench is the universal control head. Such an item allows any number of different units to be operated on the bench. Such a control-head consists of central controls, and suitable patch cables for each type of equipment desired. Construction of a universal control head is not difficult. By building in certain features, the possible units which can be operated is virtually limitless. Such a control head will be the primary feature of next month's Technical Talk.

As I have stated before the list of what to acquire has been based on personal experience and need for items of test equipment. The list is by no means sacred. Each person will have an individual preference for various pieces of equipment. Thus, the list should be altered for individual taste.

Announcement

The summer meeting of the Texas VHF FM Society will be held August 14 and 15 at the Cibola Inn in Arlington, Texas (neutral ground between Dallas and Ft. Worth). The two day meeting will consist of displays, technical sessions, and family outings on Saturday, and a business meeting, door prizes, and raffle on Sunday. The meeting is hosted by the North Texas Repeater Association. All interested f.m.'ers, regardless of home locale, are invited to attend.

News

Believe it or not, the questions for the last month or so have been few and far between. Thus, no Q & A this time. However, the news items have been coming in fast and furious. This is good. For example, the boys up around Council Bluffs, Iowa, have a 146.22/146.82 machine in operation. Philadelphia, Pa. has three repeaters going now, with 146.28 and 146.34 input and 146.76 output on two meters (WA3BKO); 52.76 input and 52.64 output (WA3KUR) on six meters; and 448.8 input and 443.8 output on 3/4 meters (WA3KUR). All repeaters are open.

Along the lines of the organizations mentioned in the opening paragraph, a similar organization has been formed in North Carolina. This organization, comprised of representatives from eleven cities is called the North Carolina FM Repeater Association, Inc. The president is K4RUQ or Durham. Further information can be obtained from the secretary, Bill Parris, K4GHR, Route 6, Box 605, Salisbury, N.C. 28144. With the announcement of the new group, there came a list of the repeaters in North Carolina. They are as follows: Elizabeth City 146.28/.88; Charlotte 146.34/.94; Roaring Gap 146.22/.94; Lexington 146.31/.91; Durham 146.34/.94; Raleigh 146.28/.94; Greensboro 146.16/.76; High Point 146.34/.94; Salisbury 146.28/.88; North Wilkesboro 52.78/52.525, 146.42/52.525, and 52.525/145.05. Also, Danville, Virginia, has 146.28/.88.

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[1] Burgess, H.F.; "High Accuracy VHF Frequency Measurements"; *73* Magazine; September, 1966; pp 22-24.

The number of newsletters either strictly for or containing mostly f.m. is increasing. Many of these newsletters are quite well written and contain technical information as well as local news. One thing which helps out these newsletters is exchanges between themselves. Swapping of editions with permission to use portions (giving due source credit, of course) helps everyone. I use these newsletters for "grass-roots" news items and general information. Here is a list of newsletters which are being sent to me. If your newsletter is not listed, why not start sending me a copy. Also, contact the editors of the listed newsletters for exchange of editions.

Newsletter	**Editor**	**Address**
The Condenser	K9WHF	RR2 Box 358, La Porte, Ind. 46350
QSP	WA4FBI	P.O. Box 2812, Tampa, Fla. 33600
The World of FM	K1TKJ	Rm 5501, 70 Pine St., N.Y., N.Y. 10005
Grid Leak	W0RSA	P.O. Box 92, Pueblo, Colo. 81002
The Repeater	W6ADF	P.O. Box 1333, Richmond, Cal. 94802
Sierra Ham News	K7VYT	P.O. Box 7808, Reno, Nev. 89502
Rambler	VE2ZD	44 Poitiers St., Touraine, P.Q.
RAMS	W6TEE	P.O. Box 214091, Sacramento, Cal. 95821
CARC Relay	W6TEE	4124 Pasadena Ave., Sacramento, Cal. 95821
Mt. Vaca News	K6HHD	6606 Fifth St., Rio Linda, Cal. 95673
Miami Valley FM Assoc.	W8SLY	7575 McEwen Rd., Dayton, Ohio 45459

Repeater Outputs Above 147 Mc

The April column carried information on an interpretation of present amateur regulations governing repeater inputs in the 145-147 mc range and outputs above 147 mc range. The original interpretation was published in the Texas VHF FM Society Newsletter, Volume 2, No. 4, July/August 1966, page 2. A second interpretation on the matter was obtained by the ARRL and published on page 84 of the May, 1971, edition of *QST.* This interpretation bore out the original contention that Technician operators could not operate using a repeater with an output in the 147-148 mc region. See *QST* for details on this interpretation. Immediately after publication of the original interpretation in this column amateurs in the California area contacted the ARRL, local FCC offices, and this writer. The ruling obtained by the ARRL was the one published in *QST*. The local FCC offices stated (according to various sources) that if an amateur holding a conditional or higher class of license manned the control point it was legal for a Technician to use the repeater. Since this was contradictory to the two other rulings I contacted the FCC concerning the matter. The situations presented to the FCC were as follows:

Given: A duly licensed amateur repeater station operating on a frequency input of 145-147 mc and an output above 147 mc or below 145 mc.

Condition 1. An amateur with a Technician class of license manning the control point.

Condition 2. An amateur with a Conditional or higher class of license manning the control point

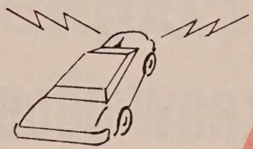
In either condition is it legal for a Technician class of operator to knowingly operate the repeater which has an output outside the normal frequency band allowed the operator?

If the operation is in violation of present regulations would the responsibility for such operation rest on the individual amateur operating on the input frequency, on the owners or licensee of the repeater, or both?

The reply received from FCC Washington read as follows: "The Rules are not absolutely clear with respect to the questions you raised. However, we are considering these matters in connection with Docket No. 18803 and will answer your questions when a decision has been made."

To put it bluntly, I am quite confused. The only apparent solution for those with outputs above 147 mc or below 145 mc is to tread lightly. Also, these persons will probably want to support the ARRL's RM 1535, submitted in November, 1969. This proposed opening the entire two meter band to the Technician class of amateur. As of this writing no action has taken place on RM 1535. Consult *QST* and ARRL for details.

[*Continued on page 102*]



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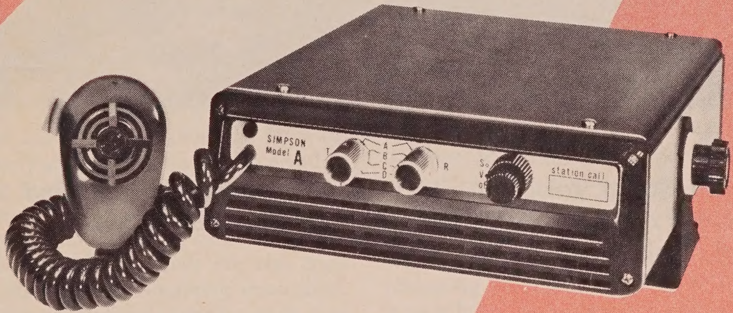

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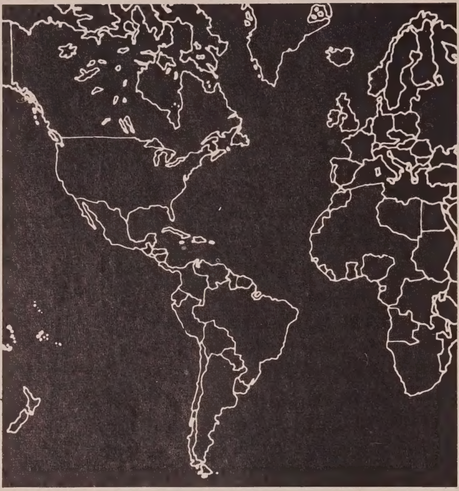

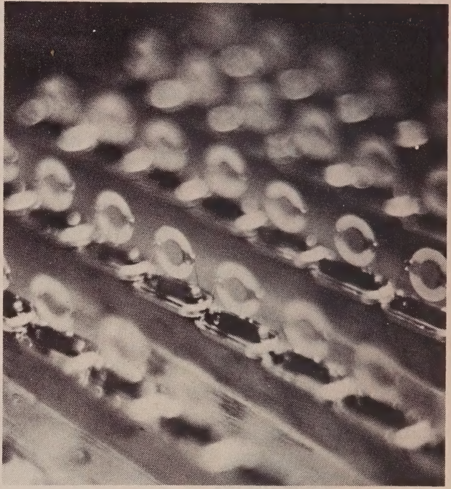

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PAYMENTS AND INTEREST

How Much Does That New Rig Really Cost

BY GLEN E. ZOOK,* K9STH/5

THE trend in prices of new amateur equipment is in one direction, up. With the increased cost, many amateurs must resort to the "Great American Way," financing. Financing is an art in itself and understanding the ins and outs of it are beyond most of the American public. This is why federal truth in lending laws have been passed. However, many persons still do not really understand what this means. No attempt will be made here to explain every facet of finance. The author's main exposure to financing has been on an academic and practical level (as the borrower) rather than being involved in the lending business. There are, however, a few simple rules and a formula which will give the true financing costs rather than apparent financing costs which are the costs usually quoted by the financing institution. The fine print of the final contract must now express the true finance charge, but that usually comes only at the last moment. By using the formula and the rules, the amateur can accurately determine the actual finance rate and charge from a minimum of published or verbal information.

When a new or used piece of equipment is purchased on a time-payment plan, a contract is signed and payments are made on a periodic basis (usually monthly). This contract may be considered, for all practical purposes, to be for cash in the amount of the purchase price (less trade-in, etc.). The piece of equipment involved has a lien placed against it and serves as security for the cash loan.

The interest quoted on a time installment plan is usually a fairly low rate, such as 6% or 8% per year. However, this rate is only the apparent rate. The actual rate is much higher. The quoted rate would be true if the amount were owed for one full year with no payments except for the final payment plus the interest. Since the amount is usually paid in monthly installments, the average amount owed is approximately 1/2 of the total amount. This is calculated by the following formula:

$$\text{Average} = \frac{\text{Beginning Amount} + \text{Ending Amount}}{2}$$

Since the ending amount is zero (when considered based on one year loan and paid back in that year), the average amount is 1/2 of the beginning amount. Thus, the average interest is twice the quoted amount. The reasoning behind this is that as the amount is paid back, the principal is reduced, and the average over the entire year is that only 1/2 the original amount borrowed was actually used. A simplified example would be a loan in which the basic principal were $120. Assume no interest. By paying $10 per month, the amount owed is reduced to $110 after the first payment, $100 after the second payment, and so on until zero is reached. During the first few months one is using most of the borrowed money. However, during the last few months one is using only a small part of the borrowed money (since most has been repaid).

Now, if we add interest at a given amount to this loan, the average money being used during the year comes more into view. The average for the year would be as follows:

1st Mo.	$120
2nd Mo.	110
3rd Mo.	100

---

*818 Brentwood Lane, Richardson, Texas 75080

4th Mo.	90
5th Mo.	80
6th Mo.	70
7th Mo.	60
8th Mo.	50
9th Mo.	40
10th Mo.	30
11th Mo.	20
12th Mo.	10
	$780

$$\text{Average per month} = \frac{\$780}{12} = \$65$$

Now, lets assume that the quoted interest rate were 10% of original borrowed amount. This would amount to $12. Since interest rate is calculated by dividing the interest paid by the amount borrowed, one can calculate the actual interest rate paid on the average amount owed. In this example it would be:

$$\frac{\$12}{\$65} \times 100\% = 22.2\%$$

Both the first example of twice the quoted rate and the second a more refined 2.22 times the quoted rate are approximations. These examples are to show a little (albeit very little) groundwork for he actual formula to give true interest rate, This formula is as follows:

$$T = \frac{2\,m\,I}{P\,(n+1)}$$

Where:

P = Principal (original amount borrowed)
m = Number of payments in the year (12 monthly)
I = Interest charge in dollars (quoted rate × principal)
n = Total number of payments (12 if 1 year, etc.)
T = Actual interest rate

Sample problem:

P = $500
m = 12 (monthly payments)
Interest rate = 6%
I = $500 × 6% = $30
n = 12 (pay off in one year)

Therefore:

$$T = \frac{2 \times 12 \times \$30}{\$500\,(12+1)} = \frac{720}{500 \times 13} = 11.1\%$$

As can be seen, the resultant 11.1% is not quite twice the originally quoted 6%, but is close enough to approximate as twice. Of course the formula holds true for other payment terms and lengths of contracts. Also, it holds true for all types of financing, not just amateur radio gear.

For contrast, lets look at the payment schedules of two large companies. The firms involved will remain unnamed, but the same holds true for most other firms.

One firm states that it charges a flat 1½% per month on the unpaid balance. When this is true, the actual yearly interest is 18% (12 × 1½%). This is because the interest rate is applied to the balance each month taking into account the reductions made by payments. If the 1½% per month were based on the original amount only, then the actual interest rate would be much higher, in the neighborhood of 33.2%. In either case, it can easily be seen that the interest to be paid should be considered before signing the time-payment contract.

The second firm adds a flat charge called a "carrying charge" (not tax deductible as interest is) of approximately 10% for repayment periods of not longer than 1 year and approximately 15% for 18 months, 20% for 2 years, and so on. By the way, this is how many retail outlets base their sales. Other outlets use the method outlined in the case of the first firm. For simplicity, one example of 1 year and one example of 18 month repayment will be illustrated. This may be applied to other amounts and repayment plans.

Example:

Unpaid balance = $250
Carrying Charges = $25
Monthly payments = $23
(actually 11 at $23, 1 at $22).
Quoted interest = 25/250 = 10%

By using the "T" interest rate formula the actual interest rate is found to be approximately 18.5%. If the unpaid balance were at the lower end of the same repayment schedule of $23 per month, $240.01, the carrying charges would be the same $25, but the quoted interest would rise to 10.4% and the actual interest would be 19.5%. However, if one cent more were paid at the beginning, and the unpaid balance brought down to $240.00, then the quoted interest would again be 10% and the actual interest 18.5%.

In the case of the 18 month repayment

[*Continued on page 98*]

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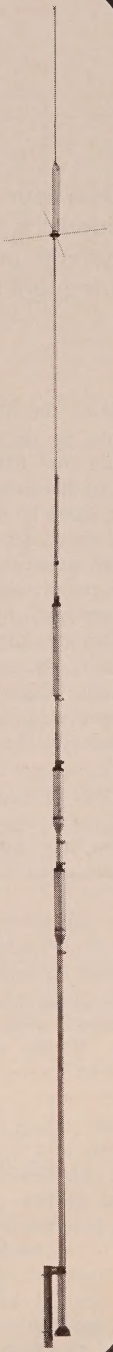

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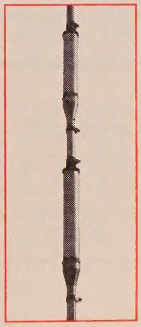

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The Ultimate Auto Alarm-Model II

BY JOHN W. CRAWFORD,* WA4SAM

Over four years ago the author wrote an article describing what was considered by many to be an excessively complex automobile burglar alarm system[1]. In the past few years, however, even that system has proved inadequate in many cases. The Model II alarm goes several steps further in providing equipment and vehicle protection.

SINCE the author's last article in *CQ* on alarms in cars, his automobile has been broken into fifteen times! Because the sum total of his ham radio operating is presently being done from the car and all of his tools, TV servicing equipment and other miscellaneous items such as tape decks, stereo f.m. radio etc. is in the car, there is an understandable amount of churning of the stomach each time an atempted robbery occurs. After each break-in, the ensuing panic produces modifications which have finally resulted in The Ultimate Alarm, Model II.

Basically, the alarm consists of a relay box which triggers a conventional siren, an electronic siren, flashes the headlights and horn off and on, and turns on the interior lights. Additionally, a transistorized f.m. transmitter in the trunk transmits a 1 watt, 1000 c.p.s. tone via an antenna hidden inside the rear window. This tone is picked up on a monitor receiver in an apartment or on a Pageboy pocket receiver which is used when the author is in a movie or some distance from the car. Further, if one of the many thieves or pranksters in this area touches the car, an intermittent (one second on, one second off) beeping is heard in either monitor receiver. If the hood, trunk, or doors are opened, the alarm sounds and a continuous beep is heard in either monitor receiver. If the thief decides to read the warning stickers in the window

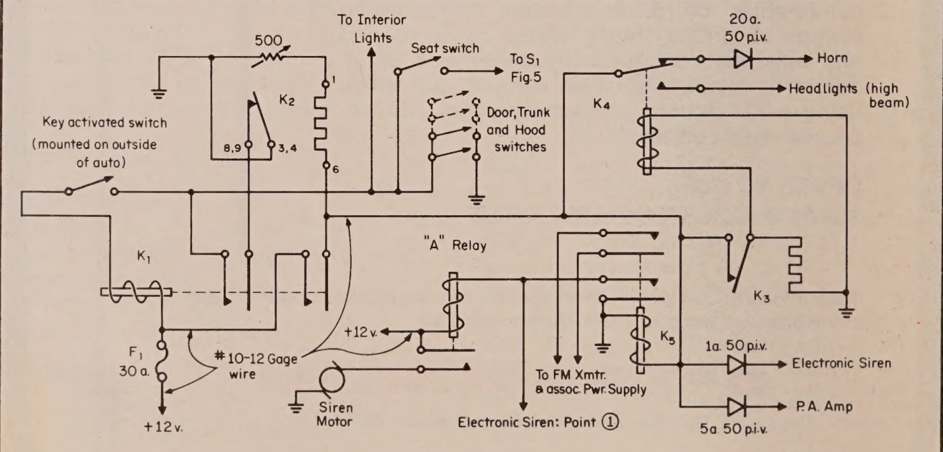
To Interior Lights
500
Seat switch
To S₁ Fig.5
20a. 50 p.i.v.
Horn
Headlights (high beam)
K₂
1
6
8,9
3,4
Door, Trunk and Hood switches
K₄
Key activated switch (mounted on outside of auto)
K₁
"A" Relay
K₃
F₁ 30 a.
#10-12 Gage wire
+12 v.
+12 v.
Siren Motor
K₅
1a. 50 p.i.v.
Electronic Siren
To FM Xmtr. & assoc. Pwr. Supply
Electronic Siren: Point ①
P.A. Amp
5a 50 p.i.v.

Fig. 1—The Basic Alarm/Triggering Circuit may be built into a 3 × 4 × 6 Minibox together with the siren module shown in fig. 2.

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*1065 W. 50 St., Norfolk, Va. 23508.

[1] Crawford, J. W., "The Ultimate In Automobile Alarms," *CQ*, Apr. '67, p. 29.

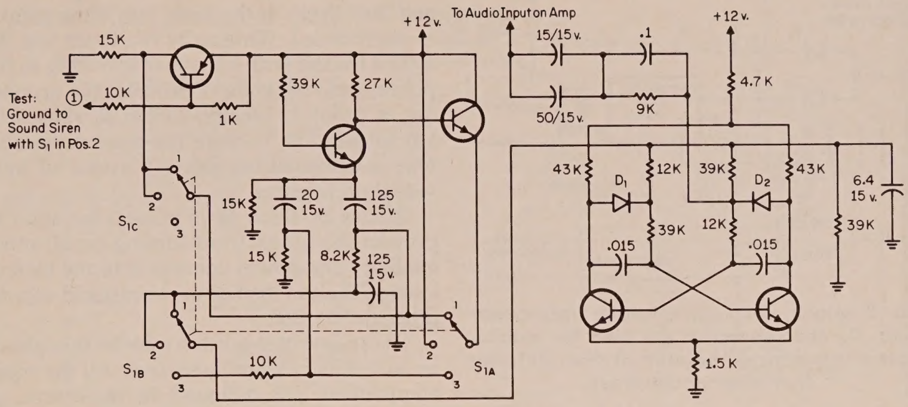


Fig. 2—Circuit of electronic siren module. Transistors are general replacement type (audio). S_1 is mounted on the dashboard with a test switch.

(Most don't) and tries to circumvent the alarm by breaking a window, the intermittent tone is transmitted. As soon as he goes through the window and hits the seats, the alarm goes off anyway. If he cuts the battery wire from underneath the car, he has almost won. However, the tone is transmitted anyway and cannot be turned off.

Basically, the alarm is as shown in fig. 1. This shows the main unit which triggers the various sound devices. It would seem that the number of relays is cumbersome and that, in some cases, transistorized switching would be in order. However, the author's junk box was full of surplus relays. Many modifications are possible; for instance, if all the parts are bought new, a 4 p.s.t. relay may be substituted for K_1 and K_5. A heavy duty turn signal flasher may be substituted for K_3 and K_4. Or, if the later are used, K_4 may be hooked to the mechanical siren to provide a rise and fall wail. It is obvious that the circuit can be adapted to whatever noisemaker is available.

The "A" relay is a common type of on-off relay used in Motorola or G.E. installations and should be used to avoid drawing excessive current through the alarm contacts and associated wiring; the starting current on even a small siren is usually in excess of 60 amps. The heavy wire from the siren should be routed directly to the positive battery terminal. The siren itself may be obtained from any auto supply store, usually with a key operated switch and door jamb switches.

The delay relay, K_2, is used to shut the alarm off if the owner is not around and therefore save the battery. This was obtained from Edlie Electronics. It is a 6.3 volt, 3 minute delay, normally closed, octal plug relay. The 500 ohm pot can be set to a few volts or below 6.3 to change the timing but this must be done during the time the whole alarm system is actuated due to the voltage drops throughout the system. Because of the changing resistance in the heater as it warms up, the current drawn through the pot will change and thus it is advisable to wait halfway through the cycle and then set the voltage on the pins of the heater to the desired level. Thus for a three minute delay the pot should be adjusted 1½ minutes after the alarm has started going off to a voltage of exactly 6.3v.

Similarly, the flasher relay K_3 can be chosen so it is on more than off, or can be eliminated entirely at the risk of having the horn sound like it is stuck. An optimum value was found to be approximately ten times per minute approximately six seconds on, six seconds off). An Amperite 6F10T is recommended.

The sensing units which trigger the alarm are the ordinary interior light switches which actuate when the doors are opened. To protect the hood and trunk, similar switches were strategically placed and wired in parallel with the door-interior light system. The seat sensors are microswitches with long actuator arms affixed to the bottom of the seat frame. The arms rest against a point near the bottom of one of the coil springs. These also are wired in parallel: one wire goes to the interior

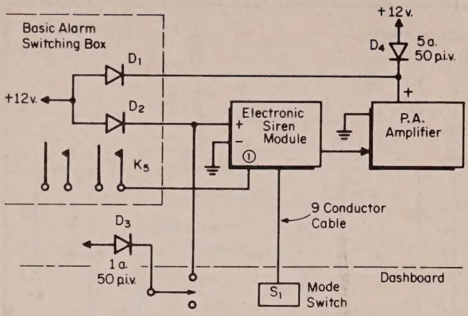


Fig. 3—Alarm, siren and amplifier interconnections. D_4 and connection are used for installations where p.a. will be used at times different from siren or alarm use.

light circuit and the other is connected to S_1 in figure 5. Unless a separate wire is used for the sensor switches (distinct from the interior light system) the interior lights will turn on while driving or when something is placed on the seat. Thus there should be a cutout switch which is part of the function S_1 performs.

Figure 2 is a schematic of the siren of a Dietz siren-light/P.A. system used by the local police. A manual was obtained on the unit and the siren module built on a printed circuit board using general replacement type transistors (audio) from Radio Shack. This was considered preferable to using one of the cheap modules because of the distinct tone of this one. The output from this was fed to an already installed P.A. system. The connections were made as shown in fig. 3. The siren switch S_1 was mounted on the dashboard of the car with a test switch. When it is desired to sound the siren, with the test switch on, position 1 of S_1 will produce a slow rise and fall continuously, position 3 a sharp yelp: a fast rising and falling tone. Position 2 will rise slowly to full pitch if point 1 is grounded, and then decay at the same rate when point 1 is ungrounded. (Originally the latter was designed for use with a manual horn ring in the police cars.) K_5 in fig. 1 provides the grounding of point 1. Ideally, switch S_1 should be left in position 3 where the most noticeable tone is delivered but this is a matter of individual preference.

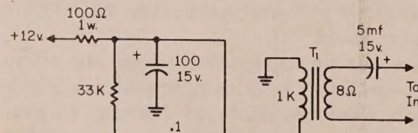


Fig. 4—Tone oscillator for transmitter alarm. Q_1 and Q_2 are general purpose audio transistors.

Diodes D_1-D_4 in fig. 5 provide isolation to prevent the alarm from turning on all other auxiliary equipment connected to the battery system, such as the heater, windshield wipers, other radios, etc.

The transmitter portion may be thought of as an auxiliary standby system. All the main components are mounted in the trunk. A device called a "Devil Dog" available from Northwest Electric Co., Mitchell, S. Dakota was used, but this is no more than a clapper which vibrates upon motion of the surface to which it is mounted and in doing so, grounds out. It is suprisingly sensitive and can be set either so a sneeze will trigger the transmitter, or so the wind blowing won't. A delaying device (fig. 5) actuated by a d.p.d.t. center off, one side momentary contact switch waits until the operator is out of the car, has closed the door and the clappers have stopped moving. It then sets the transmitter system to the ready position. This switch also sets the seat switches in the on position. This switch was mounted inside the car for convenience. A short signal normally will be transmitted when the car is opened until the switch is pushed to its center position. One clapper in the trunk and one under the hood will provide adequate protection.

After the delay circuit drops out, the system is in a passive state, *i.e.*, no current is being drawn. Then, if the clapper contacts are momentarily closed, K_6 energizes. The "on" time for this relay is determined by the value of the capacitor across the coil. 100 mf should be about right for most values of coil resistanse and a fairly fast pulsing of the clappers.

The transmitter pulsing circuit is merely a flip-flop which alternately turns $Q3$ on and off, thus closing miniature relay K_7. In the prototype, Q_3 was at first used to key the transmitter but it was found that even the high resistance of Q_3 in the off state was enough to give a milliwatt of signal, and eventually run down the battery.

The batteries used were RCA VS139 rated at 7.5 volts each. They were used because the

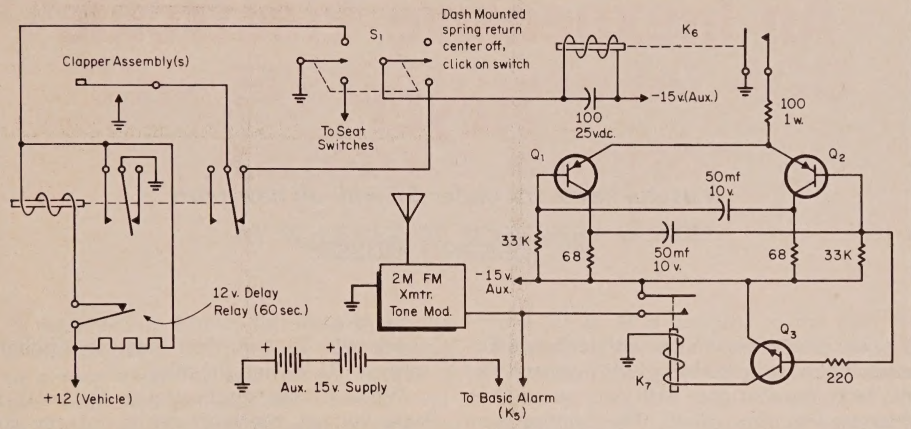


Fig. 5—Clapper delay circuit and transmitter triggering circuit.

transmitter is positive ground and therefore not compatible with the car's electrical system. The two in series give 15 volts at fairly high current to provide a 1 watt output for the transmitter. Since the cost is high ($4.75 each), "Hotshot" batteries may be used or any other type supplying the rated voltage. Rechargeable types are available surplus and it would be a simple matter to rig a polarity switch to facilitate charging them from the car system when not in use. The transmitter is a GE, completely transistorized, which came from a walkie-talkie. A 146.94 mc crystal was used because the matching Pageboy receiver can then be used at hamfests also. It was mounted in a 2 × 2 × 9 inch Minibox with the tone board seen in fig. 4. This tone module may be made from scratch or else one of those so called fire alarm modules available commercially may be used. Holes are drilled over the portions on the transmitter which need tuning while loading to the antenna.

A hi-band walkie-talkie transmitter with power supply can be obtained from Gregory Electronics for about 15 dollars. Although this is a tube type, the filaments only require about a second to heat up. If this type is used, the R-C values in the flip-flop should be increased: 200 mf for the capacitors should do it.

The output is fed through a short length of coax to a small hole drilled in the rear deck of the car just inside the window. The center conductor is fed through this hole and the shield grounded just below it. The inner conductor is cut near the hole and spliced to a thin piece of solid hookup wire to make it inconspicous. This wire is cut to frequency (an s.w.r. bridge and cut-and-try method were used) and a piece of nylon fishing line was tied to a loop in the opposite end of the wire. The other end of this nylon line was anchored underneath the moulding above the window. Care must be taken when tuning the antenna: key down should not exceed 30 seconds out of every 60 to prevent damage to the output stages.

The above seems to be evidence of going too far with something, at first glance. In most instances this is so. But things in the authors area are getting worse. As mentioned before, the car has been broken into 15 times. Nothing has been taken; the alarm scares them off before they have a chance. The basic circuit of a relay to sound the horns was used for a long time until it was learned that another person had his car entered. He had a similar alarm and the thief apparently knew it, for when the owner came out the next morning the alarm was still set but a tapedeck and the center support for the roof were both missing. It was after this that the author began to worry and the above system was devised.

Several modifications are still possible—it is merely up to the imagination of the designer to effect them. One can have the clappers sound the alarm itself if the key operated switch is tampered with and the door then opened. The transmitter circuit

[*Continued on page 96*]

An Inexpensive Electronic Keyer

A useful keyer for under $7 with all new parts

BY JOSEPH J. RUSSO*

If you would like to use an electronic key instead of a straight key or bug, but don't like the price tag that goes with one, you will be interested in this article. The average ham will have all of the parts on hand.

The key operates on the very simple principle of rapid charging of capacitors, and their controlled discharge through a relay coil. Of course, no memory is included, nor any of the other very nice features found in elaborate keyers. The keyer, however, is an easy way to get your feet wet in the use of electronic keying systems.

Operation

When the dot side of the paddle is pressed, capacitor C_2 starts to charge through R_2 and the normally closed contacts of K_1. This charge rate is very fast and as soon as the relay pull-in voltage is reached, the relay is energized. C_2 will then start to discharge through R_3, R_4 and the relay coil.

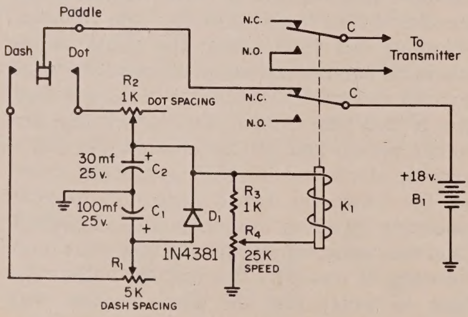


Fig. 1—Schematic of an inexpensive electronic keyer. Total parts outlay should be less than $7 at catalog prices. Relay K_1 is a d.p.d.t. plate current relay with 1K to 10K coil resistance. Battery B_1 is two 9v. transistor radio batteries in series. The circuit may be neatly housed in a small Minibox, with a three-circuit jack for connections to the keyer paddle.

When C_2 has discharged to the relay release voltage, the relay drops out, the contacts close) and the cycle starts over again and will continue as long as the dot side of the paddle is pressed.

When the dash side of the paddle is pressed, capacitors C_1 and C_2 start to charge through R_1 and the normally closed contacts of the relay. Diode D_1 places both capacitors in parallel. Again the charge rate is very fast and as soon as the relay pull-in voltage is reached, the relay contacts open and capacitors C_1 and C_2 start to discharge through R_3, R_4 and the relay coil. Potentiometer R_1 adjusts the space between dashes. Potentiometer R_2 adjusts the space between dots. Potentiometer R_4 adjusts the speed from approximately 10 to 40 words per minute.

Proper adjustment is obtained when the time for a dot and the space betwen dots are the same and when the space between dashes is the same as the space between dots. The dash should be three times the width of a dot. This is accomplished by making capacitor C_1 approximately three times the value of C_2. The relay coil should be a high resistance type between 1K and 10K. An oscilloscope is ideal for making these adjustments, but they can be made by ear if an oscilloscope is not available.

The resistance of the relay coil used in this circuit is 2.5K. If a relay coil of different resistance is used, it may be necessary to alter the value of capacitors C_1 and C_2 to obtain word speed operation between 10 and 40 words per minute.

The normally open contacts of K_1 connect to the key input of the transmitter. All that is needed now is a paddle. A bug can be modified to act as a paddle or one can be fabricated with a little ingenuity. ■

---

*410 Crump Rd., Exton, Pa. 19341

CQ Reviews:
The Hy-Gain Model 400 Antenna Rotator

BY WILFRED M. SCHERER,* W2AEF

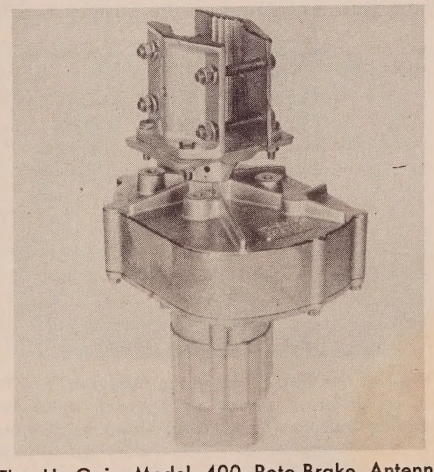
THE Hy-Gain Model 400 Roto-Brake Antenna Rotator is a brute-force job, designed to deliver a starting and rotating torque of over 4000 inch/pounds. It will handle a vertical-load of 800 lbs. A solenoid-operated brake at the motor shaft provides a braking torque of 5000 in/lbs. and is designed to slip under a wind-load stress over 5000 in/lbs, thereby protecting the unit from damage. This rotator should thus easily take care of large beam antennas and stacked arrays.

Included with the rotator is a control box equipped with a directional pointer and supplied with a Compass Rose or a choice of several Great-Circle maps centered on three different geographical locations. The box may be desk or wall-mounted.

The rotator is built into a heavy cast-aluminum housing. A high-ratio gear drive is made up of heavy-duty machined spur gears of steel that are "permanently" lubricated, requiring checking only every five years. The gears are powered by a 1/10 H.P. motor that is a split capacitor type for high starting torque to overcome static inertia loads. Brushes are not employed in this type of motor, precluding arcing or r.f. hash during rotation. The motor is designed for outdoor use in temperatures of −30° F. to 120° F. It is coupled to the gear train through a fiber gear to minimize noise and vibration. The speed of rotation for the antenna is 1 r.p.m. and it covers 380°, thus providing a 20° overlap over one revolution.

The main shaft is supported by a sleeve-type thrust bearing and an end bearing. At the top of the drive shaft mounts a steel plate braced at the bottom and flat at the top. There are four holes in it for 3/8″-diameter bolts used for fastening two Ductile-Iron vertical V-shaped clamps that are serrated to dig into and securely grip an antenna-mast. Holes in the clamps are also provided for pinning the mast should extra holding power be required. The mounting holes on the shaft plate are oblong to enable the serrated clamps to be spaced for accepting mast diameters of 1¼″-3″ o.d., and also aid proper alignment of the shaft with a thrust bearing that is required at the upper portion of the mast for lateral support, as is common with many rotators.

Control box for the Model 400 shown with azimuthal map centered on the Central U.S.A.


The Hy-Gain Model 400 Roto-Brake Antenna Rotator shown with the serrated mast clamps at the top.

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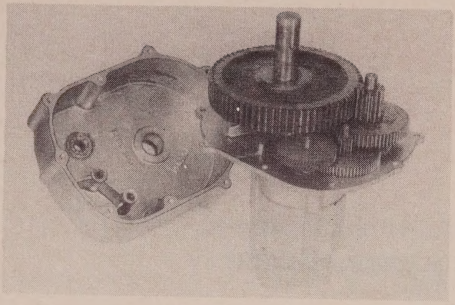
*Technical Director, *CQ*.

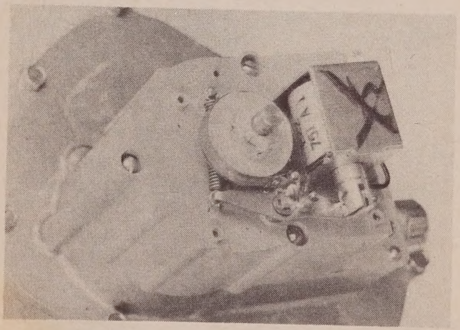


Interior view of the Model 400. Real husky gears are used. An idea of the ruggedness of the housing may be had from the top of the case in the background.

The rotator is designed to be mounted on a standard antenna-tower plate in a tower whose leg spacing is a minimum of 10″. The rotator is installed beneath the plate and is secured from the top by four bolts passed through the plate. Mounting kits also are available for side-mounting on a pole or a smaller-size tower.

The control box contains a transistorized logic circuit that senses the direction the motor must rotate for positioning the antenna in the desired direction, and to stop rotation when the desired point is reached. These circuits are controlled by a potentiometer at the rotator and one in the control box. A mechanical limiting setup in the control box prevents rotation greater than 380°.

The four optional dial faces that are supplied may easily be installed on the control box. One is centered on the Eastern U.S.A., one on the Central portion and another on the Western section. The fourth one, used for other areas, is the Compass Rose.



View of the Roto-Brake in the Model 400. A flat piece of brass serves as a brake band held against a drum which is a flat-sided metal wheel. Tension is applied by a heavy-duty spring in the foreground and is released when necessary through a lever operated by a solenoid in the background.

All operation is derived from a 117 v.a.c. 60 c.p.s. source at a maximum current drain of 2 a. A red lamp indicates when power is applied to the control box; a white lamp lights when the motor is rotating. A serrated thumbwheel is used to set the pointer for the desired azimuthal direction.

Five wires are needed between the control box and the rotator. The wire size depends on the required length and must be such that holds the voltage drop to within 2%. Suggested wire sizes v.s. length are given in the instructions.

Operation

Operation is as follows: With the control-box power turned on (red lamp on) the thumbwheel is operated to place the dial pointer for the desired antenna direction, at which time the motor starts as indicated by the white lamp. It automatically stops when the preset direction has been reached. Where a change in direction of less than 10° or so is desired, the thumbwheel has to be operated to advance the pointer approximately 10° before the motor starts and then be retracted so that the pointer rests at the desired azimuthal change that is less than 10°. This can be a little disconcerting at first, until one becomes accustomed to the operation.

The amount of advance of the thumbwheel needed to set the motor in operation depends somewhat on the cable length. An adjustment control is therefore provided in the control box to minimize the required advance accordingly.

Specifications are that the rotator should not be operated continuously for more than two minutes (equivalent to two 360-degree sweeps) without a rest period of 8 minutes to allow the motor to cool off. Shorter periods of rotation require shorter rest periods at a ratio of 1 on to 4 off.

The rotator weighs 28½ lbs. Its size is 14″ H. × 7½″ W. × 9¼″ L. In respect to the size, a consideration that must be taken into account during installation is that the antenna-drive shaft is not centered with the housing,[1] requiring the assembly to be offset somewhat from the center of the antenna-

[*Continued on page 98*]

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[1] It is about 1¼″ off center along the 9¼″ dimension.

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No. 257

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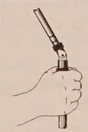
Order No. 256	40 meter mobile coil	**$17.95**
Order No. 255	20 meter mobile coil	**$15.95**
Order No. 254	15 meter mobile coil	**$12.95**
Order No. 253	10 meter mobile coil	**$10.95**

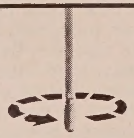
No. 256

No. 255

No. 254

No. 253


Shake-proof SLEEVE LOCK releases fold-over hinge.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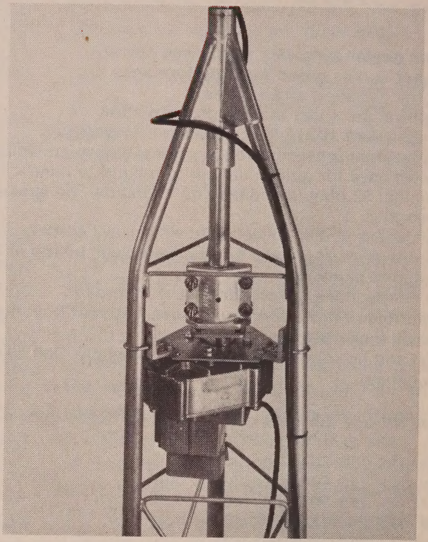

- Handles large beams and stacked arrays with ease
- Delivers over 4,000 IN/LBS of starting and rotating torque
- Gear train protected by husky cast aluminum housing
- Solenoid operator brake adjusted to slip at 5,000 IN/LBS to prevent damage
- Extra heavy duty machined steel gears for maximum strength
- Handsome control unit features sweep pointer over choice of three great circle maps or compass rose
- Select desired position and rotator's logic circuit brings into desired position
- Capacitor start for high torque
- Operates off 110VAC 60 cycle power source
- No blind spots—moves 380°
- Antenna automatically moves to position when control is activated
- Heavy duty mast clamp takes up to 3" O.D. mast
- Mounts to standard tower plate with min. of 10" tower leg spacing
- Mounting kits available for poles or small towers
- Universal tower mount available
- Temperature range—30° F to 120° F
- Permanently lubricated
- Requires one 5 wire cable
- Cable available from Hy-Gain 412

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Model No. 400

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DX

BY JOHN A. ATTAWAY,* K4IIF

THE No. one topic of discussion in most DX Bulletins continues to be the FCC Phone Band Expansion Docket 19162. Naturally this subject is of great interest in Canada, and the Canadian DX Association bulletin, *Long Skip,* did an excellent job explaining the situation to it's readers. VE DXers were advised to "resist the temptation to scream the place down" and to thoroughly study the proposals, particularly as they relate to the U.S. incentive licensing program. It was suggested that after reaching a clear understanding of the matter, they should convey their opinions and suggestions to the Canadian Amateur Radio Federation, the ARRL, and to the FCC if they so desired. This is commendable, as the FCC should consider the international implications from all viewpoints.

Florida DX Record Editor, Chuck Bolvin, K4KQ, asks "was it really necessary to go hog wild, particularly on 20 meters, where the situation is so delicate? Was there any necessity for a 50 kc expansion?" This column agrees with Chuck's views on this point. In our comments to the FCC we proposed expanding only as far as 14175, and that the new 14175-14200 sub-band be for Extra and Advanced class amateurs and *should be for international contacts only*. However, we also proposed expanding the General class subband all the way back to 14200 to allow for orderly operation of nets and other group activities involving amateurs from all license classes.

Mr. Bolvin also pointed out that Novices in the northern U.S may have to forget their 3700-3750 sub-band, as the Canadians will probably move their 3750-3800 kc phone band down into the 3700-3750 segment to avoid the W,K QRM. This will blanket the Novice band with phone signals. A similar situation may exist in the south where many Latin American and Caribbean stations can be expected to make a similar response.

The WPX Program

S.S.B. WPX

603......WA4TMP
604......CT1PK
605......UY5HB
606......CR6TP
607......WA6INK
608......K5YRK
609......SM5DHF
610......SM7UV

C.W. WPX

1093......W2EUO
1094......W4AX
1095......I1LAV
1096......UA2DP
1097......UA3HP
1098......UK5UAL
1099......9V10K
1100......DM2BBK
1101......DM3ZCG
1102......UY5MV

Phone WPX

200......W9KAS

Mixed WPX

281......JA2ADQ
282......ON4QX
283......SM3ABG
284......W9WKU

WPNX

33......WN3MQJ

WPX Endorsements

S.S.B.: CT1PK–750, DL1MD–600, W2LEJ–450, W2WNW–400, K1KNR–400, W9KAA–300, UY5HB–300, W2BHK–300, and DK2BM–250.

C.W.: VK3AHQ–850, UT5CC–600, YU1NOL–500, UK6AAB–500, and W1DMD–400.

Mixed: W4LRN–1100, ON4QX–800, DL1MD–750, W2FLD–600, JA8ADQ–550, W1EQV–500, and W6KHS–450.

Phone: CT1PK–950, OE2EGL–600, WB2RLK–550, and DK2BL–500.

80 Meters: K4ZCP.

10 Meters: UY5HB.

Africa: WA0CPX, JA8ADQ, and W0YDB.

Asia: K4ZCP, WA0CPX, DK2BL, JA8ADQ, and W0YDB.

Europe: WA0CPX, UY5HB, and JA2ADQ.

North America: WA0CPX, JA8ADQ, and W0YBD.

Oceania: WA0CPX.

South America: DL1MD.

VPX-300: SM4-3958.

Complete rules for WPX, WPNX, and VPX may be found on pgs. 66-67 of the June, 1970 issue. Application blanks and reprints of the rules may be obtained by sending a self-addressed, stamped envelope to Award Manager, P.O. Box 1271, Covina, Ca. 91722, or to the DX Editor.

In the *Milliwatt,* K8EEG/0 laments that expanded phone bands "will seriously hamper QRPP operations on c.w., particularly on 40 meters where the very low power c.w. man can hardly find a clear spot today."

---

*P.O. Box 205, Winter Haven, Fla. 33880

WPX Honor Roll

The WPX Honor Roll is based on confirmed current prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix List. Scores are based on the current prefix total regardless of an operators all-time prefix count.

MIXED

W4OPM	Joe Hiller	1050
W8LY	Michael Bakos	822
W9WHM	John Leary	811
K1SHN	Chuck Banta	783
W8ROC	Frederick Riecks	781
VE3GCO	Garry Hammond	777
G3DO	D.A.G. Edwards	773
DL1MD	Heribert Rechl	762
W3PVZ	Joseph Olnick	757
W4IC	George Mack	757
DJ7CX	Leonard Poelt	734
K0BLT	Frank Cahoy	733
YU1AG	Djura Borosic	729
I1SF	Serafino Franchi	720
W0AUB	Bill Bergmann	719
W4BQY	G.B. Fisher	701
WA5LOB	James Edwards	699
CT1LN	Paulo J. S. Soelho Vieira	693
SM7TV	Boris Goransson	674
WA6MWG	John Billon	662
WA6EPQ	Larry Brockman	650
PY4AP	"Biu" Marra	633
W9ZTD	Leslie Bannon	628
WA0CPX	Edward Gray	612
W8KSR	Jon Hodgin	609
W4CRW	Robert Sommer	604
W8GMK	John Marhefka	592

SSB

W4OPM	Joe Hiller	975
W4NJF	Gay Milius	882
DL9OH	Karl Muller	757
W9DWQ	Edward Goodbout	741
HP1JC	Juan Chen	698
WA5LOB	James Edwards	692
K2POA	Arthur Johnson	683
G3DO	D.A.G. Edwards	680
I1KDB	Giampaolo Nucciotti	665
I1AMU	Alfonso Porretta	657
K1SHN	Chuck Banta	654
F2MO	Michel Dort	632
W3DJZ	Arden Hopple	620
W0YDB	W.C. Higgins	619
W4IC	George Mack	609
W6YMC	Paul Friebertshauser	553
I1LCK	Armenghi Franco	549

CW

W4OPM	Joe Hiller	900
W8LY	Michael Bakos	837
W8KPL	William Simpson	816
VK3AHQ	Henry Denver	753
DL1QT	Helmut Baumert	780
W2AIW	Charles Rodgers	776
W2HO	W. Vollkommer	720
ON4QX	Bob Berge	700
W9FD	W. W. Johler	680
WB2FMK	Robert Rasche	670
K1SHN	Chuck Banta	636
YU1AG	Djura Borosic	630
G2GM	F.D. Cawley	627
VE4OX	D.E. McVittie	600
OK2QX	Ing. Jiri Pecek	598
I1SF	Serafino Franchi	588
W8GMK	John Marhefka	562
K1LWI	Wendell Boyden	550

PHONE

CT1PK	Manoel De Almeida	894
W9WHM	John Leary	813
G3DO	D.A.G. Edwards	761
CX2CN	Samuel Barreiro	666
CT1LN	Paulo J.S. Coelho Vieira	657
W3DJZ	Arden Hopple	654
I1SF	Serifino Franchi	595
OE2EGL	Eugene Goffriller	591

Effective with the October CQ the WPX Honor Minimum will be raised to 650 current prefixes for Mixed and 600 prefixes for the other modes.

Within a few months the FCC will probably render a decision, adopting Docket 19162 either in whole or in part. Hopefully you submitted your comments, because whatever they decide will effect us all for many years.

De Extra

Philosophy of a DX Column: In 1967, when yours truly became DX Editor, many readers sent us helpful suggestions regarding the type of DX column they wanted *CQ* to carry. The overwhelming concensus was "Let's have something different; No more long lists of who worked who 3 months ago; Put some life into it!" We hope we're succeeding, many have said so, but some have disagreed.

Our approach has been to provide a "DX World Newspaper," complete with feature stories and even editorials. We know we can't keep you abreast of all the currently rare stations and DXpeditions, but we can and do direct you to the weekly DX bulletins where current info can be found.

Our features have included "Amateur Radio in Other Countries," covering Italy, France, Germany, Australia, Japan, and many others with more yet to come. Working DX the hard way is always interesting so we have periodically featured 160 Meter DX news, and kept you abreast of the latest developments in the world of very low power (QRPP) operations.

We haven't backed away from controversial matters in our editorials. When the disagreement between W9WNV and the ARRL DX Committee arose, De Extra printed the views of both sides with strict objectivity. No column in any other magazine did so. (In fact the magazine most concerned played ostrich with its head in the sand.) As working DX by the list became an issue, we again gave both sides a hearing, but when incentive licensing came up we championed only the underdog because he had little or no voice in the matter. We won the battle, RM-1393, but lost the war, and the chaotic situation which has resulted from all nets, roundtables, and other group activities being jammed into the narrow, General-class sub-bands has certainly justified our views, not that it matters any longer.

QSL information is extremely important, and we try to provide as much of it as possible. We continually emphasize the need to use s.a.s.e. and GMT to ease the load on rare stations and their QSL managers.

We also try to give you an award's program which is a real challenge. WAZ requires that you work all parts of the world to qualify. WPX provides a never-ending chase which you can continue long after all countries are worked. Champion prefix chaser W4OPM has worked over 1000 and continues to come in with a few new ones almost every month. The new *CQ* C.W. DX Award is the only purely c.w. award sponsored by a major organization.

In case these comments strike you as self-seeking and complacent, please be assured that we realize that nothing is certain but change. We continue to seek new ways to strengthen the column and the DX programs. If you have a good idea drop a line to the DX Editor or discuss it with your *CQ* DX Award Committeeman. We're always glad to hear from you. If you wish to editorialize, send us your views, and if the subject is of sufficient general interest it may end up in De Extra and *you* can handle the hot letters.

Good DX from De Extra!

Activity In The Rare Asian Zones

Zone 18: Stations in the Siberian zones can usually be located by the first letter following the number of the prefix. For example, UA9, UV9, UW9, UA9K, and UK9 stations having the letters H, I, or Y after the 9 (or K), and UA0, UV0, UW0, UA0K, and UK0 stations having the letters A, B, O, P, S, T, U, and V after the 0 are almost always in Zone 18. Two stations recently reported active are UA9YX, 14222 kc (1340 GMT) and UA0ABC, 14202 kc (1320 GMT).

Zone 19: UA0, UV0, UW0, UA0K, and UK0 stations having the letters C, E, F, G, I, J, L, M, Q, R, and Z after the 0 are almost always in Zone 19. Stations recently reported active include UA0CAN, 7006 kc (1500 GMT in W6-land); UA0IW, 7010 kc (0530 GMT); UK0CAQ, 14020 kc (1250 GMT); UK0FAD, 14050 kc (1230 GMT); UW0IT, 14050 kc; UW0IZ, 14020 kc; UA0ZI, 14006 kc; UV0IP, 14202 kc (2300 GMT); UA0FAM, 21008 kc; and UA0MX, 21027 kc (2312 GMT).

The WAZ Program

S.S.B. WAZ

851......W4EEO
868......W4FUM
869......F6AOI
870......WB6WIW
871......OD5BA
872......VK9KS
873......JW7UH
874......DJ1XU
875......DL3VX
876......I1BUP
877......VK4UC
878......I1BOX

C.W.—PHONE WAZ

3154......KH6SP
3155......WA0YAW
3156......W4YOK
3157......W5DRW
3158......F8OZ
3159......F5LQ
3160......VE5DP
3161......K6LQA
3162......PY1SJ
3163......W6EIF
3164......W9OHH
3165......K5ABV
3166......WA3FGS
3167......DL1RB
3168......DJ3SA
3169......F8OP
3170......VK4JI
3171......PY1BQO
3172......UW9WB
3173......I1BUS
3174......DL5GJ

PHONE WAZ

458......PY1HY
459......KH6HCM
460......W8CZW

Complete WAZ rules are shown on pgs. 64-66 of the June, 1970 issue. Application blanks and reprints of the rules may be obtained by sending a self-addressed, stamped envelope to DX Editor, P.O. Box 205, Winter Haven, Fla. 33880

Zone 23: UA0, UV0, UW0, UK0, and UA0K stations having the letter Y after the 0 are in Zone 23, as are all JT, Mongolia stations. Those active recently include UA0YT, 14055 kc (0200 GMT), 21021 kc (1840 GMT), and 21050 ks (1910 GMT); UA9VH/JT1, 14205 kc (1230-1340 GMT); JT1AN, 14055 kc, (1150 GMT); JT1AH, JT1AH, 14031 kc; JT1AM, 14056 kc; JT2AB, 14020 kc (2230 GMT); JT1KAA, 14040 kc (0225 GMT); and JT3KAA, 14015 kc, (1230 GMT).

New, Rare and Unusual Prefixes

BV2 — BV2ADE has been active on 14 mc c.w. QSL to Box 10 Taipei, Taiwan.

BY5 — BY5AB and other BY stations have been reported. The standing of these stations is uncertain at presstime.

DX6—DX6GI was operated by DU6RG. The QTH was Gimarsi Island.

I — Many new variations in Italian island prefixes are reported daily. Some of the more recent include the following: IA5—Tuscan Archipelago, IB0 — Ponziane Island, IC8 — Napoli Archipelago, ID9 — Eolie Island, IE9 — Ustica Island, IF9 — Egali Island, IG9 — Pelagic Island, IH9 — Pantelleria Island, IL7 — Tremiti Island, IM0—Maddalena Archipelago, IS0—Sardinia, and IT9—Sirausa Island.

HC6 — HC6CL, 28015 (2100 GMT) and HC6MJ, 28051 (1600 GMT).

HM0—HM0C, 14206 (1400 GMT).

HR — The special call HROEA was used to commemorate the recent meeting of the Organization Estados Americanos (Organization of America States) in Honduras. There was no numeral in the call so it will county as HR0.

JY9 — JY9AA was operated by WA3HUP and OM. QSLs to WA3HUP.

RF6 — RF6FCG is a Soviet v.h.f. station in the Republic of Georgia.

WU3—WU3SNA was used on May 15, 1971 by the U. S. Naval Academy Amateur Radio Club. QSL to W3ADO.

ZA5—ZA5C can be QSLed to OH2NB. The operation was in May.

The CQ DX Award Program

C.W. DX

36......DJ6TU
37......DL3VI
38......DL1YA
39......DJ4HR
40......W8DSO
41......K4BBK
42......K3AQR
43......W0AUB

S.S.B. DX

89......DL2VS
90......DJ5OI
91......DL8LH
92......VE3GMT
93......K4EKJ
94......XE2IH
95......WA3IKK
96......WA0CPX
97......VE2WY
98......W6RGG
99......W6FW
100......XE1KS
101......DL7DE
102......K1KNQ
103......UQ2KAX
104......WB4INE
105......KR6TAB
106......W9KAS
107......K4BBK
108......SM3ABG
109......WA4TMP
110......SM5AQB
111......SM7DMN

Complete rules for the CQ DX Award Program may be found on pg. 58 of the January, 1971 issue. Application blanks and copies of the rules may be obtained by sending a self-addressed, stamped envelope to the Award Manager, P.O. Box 1271, Covina, Ca. 91722, or to the DX Editor.

ZP —ZP0BK, 28013 (1700 GMT)—QSL to CX1AAQ.

3C —3C0EG, Fernando Po , and 3C0AN, Annobon Island, may be QSLed to OH2NB.

160 News

August is a funny time to be talking about 160 meters. There isn't much DX among those summertime static crashes. However, if you don't have a good skyhook up for topband its a good time to be thinking of it while there is still plenty of good antenna raising weather. As examples of what can be done on 160 DXwise how about some of these.

During the 1970-71 160 DX season, W1HGT made 324 DX QSO's with 106 *different* stations, and 1971-72 should be even better as the sunspot cycle declines. ZD8AY made a big splash from Ascension well into the spring, and many DXpeditions got on 160 including W9UCW/HK0, PJ2CC, TI9CF, and VP5JA. WA7ILC worked many JA's regularly during February and March.

Use of the DX window from 1825-1830 has been helpful and will continue to be so long as the W,K,VE gang continues to respect it.

QRPP News

More DX the hard way! WA6ABP, running 800 milliwatts (0.8 watt on 21 and 28 mc, worked many JA's and DJ's over the past few months plus 3Z9, SM5, OZ4, UQ2, UW3, YV1, UB5, OY4, G4, UA0, F3, VO1, and KL7. K2BG completed WAC by working ZS3AW, AX2EO, UV9OV and plenty of South Americans using less thn 5 watts.

Jack, K4DCD, has branched into QRPP on s.s.b. and worked many states with a homebrew transceiver running 1 watt p.e.p. When he built an "amplifier" to increase his power to 3 watts PEP he found that he could even break QSO's on 10 meters and work DX into Europe. He reports that the jump from 1 to 3 watts power made a surprising improvement in his signal.

For complete information on the new DXCC QRPP and DXCC Milliwatt awards drop a note to Adrian Weiss, K8EEG/0, Editor, *The Milliwatt*, Meckling, S.D. 57044.

QSL Information

The following volunteers to be QSL Managers for any interested DX station:

Golden Gate QSL Bureau, 71 Surrey St., San Francisco, Ca. 94131.

[*Continued on page 94*]

The most powerful signals under the sun!

hy-gain

MORE PERFORMANCE FOR LESS MONEY

Galaxy GT-550A —————— $495.00

The Galaxy 550A Total System

GT-550A Transceiver

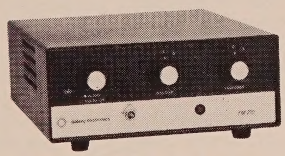
The GT-550A is the best transceiver on the market for the money. Bar none. Costs just $495.00 and delivers 550 watts of power. Operating either fixed station or mobile, this transceiver is guaranteed to have a top frequency stability after warm-up. We're so proud of the stability we include a graph with each GT-550A showing the purchaser how stable his radio was when it went through final check. 550 watts SSB; 360 watts CW; sensitivity better than .5 uv for 10db S+N/N; stable—45db carrier suppression; 25 KHz calibrator and vox option; no frequency jump when you switch sidebands. Order No. 855 Ham Net $495.00

RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

RV550A is a solid state VFO. Function switch selects the remote unit to control Receive-Transceive-Transmit frequency independently. Order No. 856 Ham Net $95.00

SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95

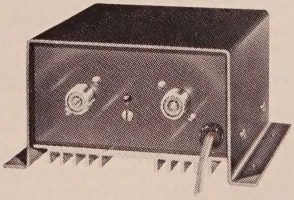


The FM-210 2 Meter Transceiver

Capability...That's what you purchase from Hy-Gain/Galaxy. Top performance from the first mass produced 2 meter transceiver. Fixed or mobile, the FM-210 will provide maximum pleasure with minimum investment. There's a full 10 watts. And all American made, too! No parts problems and backed by Hy-Gain's famous Customer Service!

The PA-210 2 Meter 35 Watt Mobile Amplifier

This all new ruggedized solid state two meter mobile amplifier provides 35 watts output to greatly increase your communication range. The PA-210 is a must for areas where no repeater is available. The PA-210 is designed as a companion for the FM-210. (When used as a system, the AC-210 power booster is not required.) A unique circuit protects the output transistor from voltage spikes and surges. All change-over relay functions are internal and controlled by FM-210 circuitry through a connecting cable.

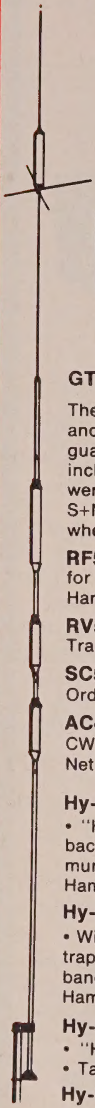


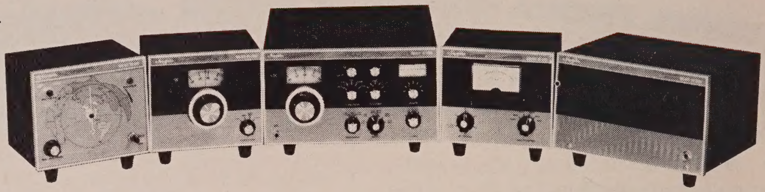
ELECTRONICS CENTER, INC.

107 Third Avenue North / Minneapolis, Minnesota 55401 / 612—338-5881

THE GALAXY 550A

MORE POWER, MORE FLEXIBILITY FOR THE Fixed Station...





GT-550A Transceiver Order No. 855 Ham Net $495.00

The GT-550A is the best transceiver on the market for the money. Bar none. Costs just $495.00 and delivers 550 watts of power. Operating either fixed station or mobile, this transceiver is guaranteed to have a top frequency stability after warm-up. We're so proud of the stability we include a graph with each GT-550A showing the purchaser how stable his radio was when it went through final check. 550 watts SSB; 360 watts CW; sensitivity better than .5 uv for 10db S+N/N; stable—45db carrier suppression; 25 KHz calibrator and vox option; no frequency jump when you switch sidebands.

RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

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SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

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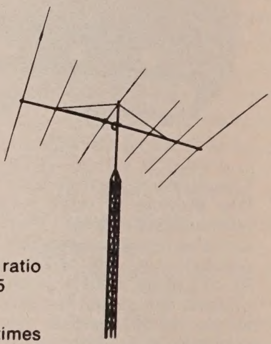


Hy-Gain's *Super Thunderbird* TH6DXX

• "Hy-Q" Traps • Up to 9.5db forward gain • 25db front-to-back ratio • SWR less than 1.5:1 on all bands • Takes maximum legal power • 24-foot boom. Order No. 389 Ham Net $179.95

Hy-Gain's 18 AVT/WB

• Wide band performance, 80 through 10 meters • Three Hy-Q traps • Top loading coil • True 1/4 wave resonance on all bands • SWR of 2:1 or less at band edges. Order No. 386 Ham Net $59.95

Hy-Gain's Thunderbird TH3Mk3 (not shown)

• "Hy-Q" traps • Up to 8db forward gain • 25 front-to-back ratio • Takes maximum legal power. Order No. 388 Ham Net $144.95

Hy-Gain's 400 Rotator/Indicator

• Handles large beams and stacked arrays with ease—up to 10 times the mechanical and braking capability of any rotator on the market. Order No. 400 Ham Net $189.95

PORTLAND RADIO SUPPLY COMPANY

1234 S.W. Stark / Portland, Oregon 97205 / 503—228-8647

Propagation

BY GEORGE JACOBS,* W3ASK

LATE August and early September is perhaps the most difficult period of the year for which to make a shortwave radio propagation forecast. This is a transition period. On some days conditions should be much the same as they were during July, but on others higher daytime and lower nighttime frequencies will be useable. which is more typical of fall and winter conditions.

For a period of about a month, from mid-August to mid-September, conditions will be neither typically summer nor typically fall, but changing back and forth between both. For this reason, this month's DX Propagation Charts cover only this *one month* period, rather than the usual two month span. Short-Skip Charts appearing in last month's column are also valid through the month of August.

During this transitional period, fairly good north-south openings are predicted for 10 meters during the daylight hours to such areas as Latin America, Africa and South Pacific. The first east-west openings should begin during early September, increasing somewhat by mid-September.

Excellent DX openings are forecast for 15 meters to Latin America, most of Africa and the Australian and South Pacific areas. East-west openings to Europe and the Far East should begin to improve by late August, becoming quite good by mid-September. The band is expected to remain open for DX during much of the daytime, and into the early evening hours. Exceptionally strong signal levels are expected during many openings, and 15 meters should be the optimum band for DX openings to many areas of the world from a few hours after sunrise, through the late afternoon hours.

Good-to-excellent world-wide DX propagation conditions are forecast for 20 meters during much of the daytime and evening hours. Peak conditions should occur during and shortly after sunrise, local time, and again during the afternoon and early evening hours. To many southern and tropical areas the band is expected to remain open through most of the hours of darkness as well. There will, however, be considerable variability in band openings during the mid-August to mid-September period.

LAST MINUTE FORECAST

August, 1971

Days	*Rating & Forecast Quality* (4)	(3)	(2)	(1)
Above Normal: 1, 4, 10-11, 17, 27-28.			B-C	C
Normal: 2-3, 5, 9, 12-13, 15-16, 18, 20-21, 25-26, 29-30.	A-B	B-C	C-D	D-E
Below Normal: 6, 8, 14, 19, 22, 24.	C	D	D	E
Disturbed: 7, 23.	D	E	E	E

HOW TO USE THESE CHARTS

The following is an explanation of the symbols shown above, and instructions for the use of the *CQ* propagation predictions:

1—Enter Propagation Charts on following pages under appropriate band and distance or geographical area columns. Read predicted times of band openings at intersection of both columns.

2—Following each predicted time of band opening is a forecast rating which indicates the relative number of days the band is expected to open during each month of the forecast period. The higher the rating, the more frequent the opening, as follows: (4) band open more than 22 days each month; (3) between 14 and 22 days; (2) between 8 and 13 days; (1) less than 7 days.

On the "Short-Skip" Chart where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. Note the forecast rating for later use.

3—With the forecast rating noted above, start with the numbers in parenthese at the top of the "Last Minute Forecast" appearing above. Read down the table for a day-to-day forecast of propagation conditions in terms of Above Normal (WWV rating higher than 6); Normal (WWV rating 5-6); Below Normal (WWV rating 4); Disturbed (WWV rating less than 4). The letter symbols (A-E) describe reception conditions (signal quality, noise and fading levels) expected for each day of the month and have the following meaning: (A—excellent opening with strong, steady signals; B—good opening, moderately strong signals, little fading and noise; C—fair opening, signals fluctuating between moderately strong and weak; D—poor opening, signals generally weak and considerable fading and noise; E—poor opening, or none at all.

4—This month's DX Propogation Charts are based upon a transmitter power of 250 watts c.w.; 1 kw p.e.p. s.s.b., or 1000 watts d.s.b., into a dipole antenna a quarter-wave above ground on 160 and 80 meters a half-wave above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, reception quality shown in the "Last Minute Forecast" will improve by one level; for each 10 db loss, reception will become poorer by one level.

5—Local Standard Time for these predictions is based on the 24-hour system.

6—The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4 and KV4 amateur call areas; The Central USA Chart in the 5, 9, and 0 areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid from Aug. 15, 1971 through Sept. 15, 1971 and are prepared from basic propagation data published monthly by the Institute For Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado.

Static levels are expected to decrease steadily after mid-August, and some good 40 meter DX openings are forecast during the early evening hours, with conditions improving during the hours of darkness and the sunrise period.

Fairly good 80 meter DX openings are forecast for some areas of the world during the hours of darkness, with conditions expected to peak just as the sun begins to rise on the "light" side of the path.

---

*11307 Clara Street, Silver Spring, Md. 20902

It's still a bit too early in the season for 160 meter DX, but an occasional opening may be possible during the hours of darkness and the sunrise period.

V.H.F. Ionospheric Openings

The *Perseids,* a major meteor shower, is expected to take place from August 9-14, with maximum intensity occurring at about 5 P.M. EST on August 12. Other, but less intense, meteor showers are forecast for August 1, 3, 5 and 18. During the Perseids shower, an average of 50 meteors should enter the earth's atmosphere every hour. Ionization produced by these meteors, especially during periods of maximum shower intensity, is expected to make possible numerous meteor-scatter type openings over distances of several hundred miles on the 6 and 2 meter v.h.f. bands.

While sporadic-E propagation is expected to taper off by mid-August, some 6 meter openings are likely to occur over distances of approximately 750 and 1300 miles. During periods of intense sporadic-E ionization, two-hop 6 meter openings may also be possible up to distances of about 2600 miles, and 2 meter openings may take place over a range of about 1200 to 1400 miles. While sporadic-E propagation can take place at anytime of the day or night, during the late summer there is a tendency for it to peak between 8 A.M. and noon and again between 5 and 8 P.M., local standard time. The occurrance of sporadic-E openings should decrease considerably as mid-September approaches.

Trans-equatorial (TE) openings on 6 meters should begin to increase during late August, and become fairly frequent by mid-September. Optimum time for TE openings between the USA and Latin America is between 8 and 11 P.M., local standard time.

Some auroral-scater openings should be possible on both 6 and 2 meters during late August and early September, over distances ranging from a few hundred up to about a thousand miles. These are most likely to occur during periods when shortwave conditions are either disturbed or below normal. Check the "Last Minute Forecast" appearing at the beginning of this column for the days that are expected to be in these categories during August.

August 15—September 15, 1971

Time Zone: EST (24-Hour Time)

EASTERN USA TO:

	10 Meters	*15* Meters	*20* Meters	*40/80* Meters
Western & Central Europe & North Africa	08-14 (1)	07-09 (1) 09-11 (2) 11-14 (3) 14-16 (2) 16-17 (1)	04-05 (1) 05-06 (2) 06-09 (3) 09-10 (2) 10-12 (1) 12-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-22 (1)	18-20 (1) 20-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)* 22-00 (2)* 00-02 (1)*
Northern Europe & European USSR	08-12 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-13 (2) 13-15 (1)	04-06 (1) 06-09 (2) 09-11 (1) 11-13 (2) 13-16 (3) 16-17 (2) 17-19 (1) 21-00 (1)	19-21 (1) 21-23 (2) 23-02 (1) 21-01 (1)*
Eastern Mediterranean & Middle East	10-13 (1)	07-08 (1) 08-12 (2) 12-15 (3) 15-16 (2) 16-17 (1)	06-08 (2) 08-13 (1) 13-15 (2) 15-19 (3) 19-21 (2) 21-00 (3) 00-02 (2) 02-06 (1)	18-20 (1) 20-22 (2) 22-23 (1) 21-23 (1)*
West & Central Africa	10-13 (1) 13-15 (2) 15-16 (1)	06-08 (1) 08-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-22 (4) 22-01 (3) 01-05 (2) 05-08 (1)	19-22 (1) 22-01 (2) 01-03 (1) 00-02 (1)*
East Africa	*Nil*	09-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-20 (4) 20-23 (3) 23-00 (2) 00-02 (1)	20-00 (1)
South Africa	09-10 (1) 10-12 (2) 12-13 (1)	08-10 (1) 10-12 (2) 12-13 (3) 13-15 (4) 15-16 (2) 16-17 (1)	07-14 (1) 14-16 (2) 16-20 (3) 20-21 (2) 21-23 (1) 23-01 (2) 01-02 (1)	20-22 (1) 22-00 (2) 00-02 (1) 22-00 (1)*
Central & South Asia	*Nil*	08-11 (1) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 18-19 (1) 19-21 (2) 21-23 (1)	04-06 (1) 18-20 (1)
Southeast Asia	*Nil*	07-09 (1) 09-11 (2) 11-14 (1) 17-18 (1) 18-20 (2) 20-21 (1)	05-07 (1) 07-09 (2) 09-10 (1) 18-21 (1) 21-23 (2) 23-00 (1)	*Nil*
Far East	*Nil*	08-10 (1) 17-19 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	05-07 (1)
South Pacific & New Zealand	10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-14 (1) 14-17 (2) 17-20 (3) 20-21 (2) 21-22 (1)	11-19 (1) 19-21 (2) 21-23 (3) 23-00 (4) 00-02 (3) 02-04 (2) 04-06 (1) 06-07 (2) 07-09 (3) 09-11 (2)	00-01 (1) 01-02 (2) 02-05 (3) 05-07 (2) 07-08 (1) 03-07 (1)*

*Predicted times of 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meters openings are shown with a forecast rating of (2), or higher.

Australia	15-16 (1) 16-18 (2) 18-20 (1)	08-10 (1) 15-17 (1) 17-20 (2) 20-22 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-15 (1) 15-17 (2) 17-21 (1) 21-00 (2) 00-02 (1)	02-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (2) 17-18 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-13 (4) 13-15 (3) 15-17 (4) 17-19 (2) 19-20 (1)	06-07 (3) 07-09 (4) 09-11 (3) 11-14 (2) 14-17 (3) 17-20 (4) 20-22 (3) 22-00 (4) 00-02 (3) 02-03 (2) 03-05 (1) 05-06 (2)	19-20 (1) 20-21 (2) 21-03 (3) 03-05 (2) 05-07 (1) 21-01 (1)* 01-03 (2)* 03-06 (1)*
Brazil, Argentina, Chile & Uruguay	08-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-22 (4) 22-02 (3) 02-03 (2) 03-05 (1) 05-07 (3) 07-09 (2) 09-11 (1)	20-23 (1) 23-04 (2) 04-06 (1) 03-05 (1)*
McMurdo Sound, Antarctica	*Nil*	13-15 (1) 15-17 (2) 17-18 (1)	17-19 (1) 19-20 (2) 20-00 (3) 00-02 (2) 02-06 (1) 06-08 (2) 08-09 (1)	00-04 (1)

Time Zones: CST & MST (24-Hour Time)

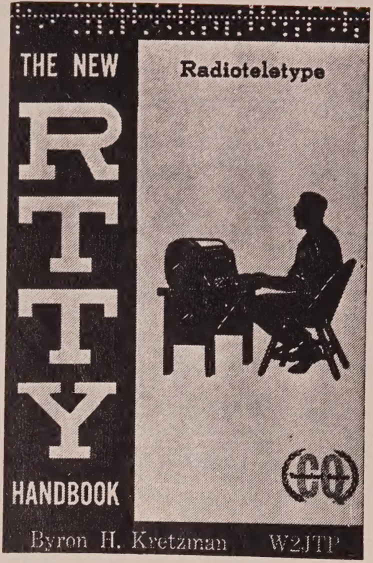
CENTRAL USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-13 (1)	08-10 (1) 10-11 (2) 11-12 (3) 12-14 (2) 14-16 (1)	04-06 (1) 06-08 (2) 08-12 (1) 12-14 (2) 14-16 (3) 16-18 (2) 18-22 (1)	19-22 (1) 22-00 (2) 00-03 (1) 21-01 (1)*
Northern Europe & European USSR	*Nil*	10-15 (1)	04-05 (1) 05-07 (2) 07-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1) 21-23 (1)	19-01 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	*Nil*	09-10 (1) 10-12 (2) 10-12 (2) 12-14 (1)	05-07 (1) 07-09 (2) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (1)	19-22 (1) 20-22 (1)* 20-22 (1)*
West & Central Africa	09-11 (1) 11-15 (2) 15-16 (1)	06-09 (1) 09-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-21 (1)	12-14 (1) 14-16 (2) 16-19 (3) 19-21 (4) 21-00 (3) 00-01 (2) 01-08 (1)	19-23 (1) 23-00 (2) 00-01 (1) 22-00 (1)*
East Africa	*Nil*	10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	12-14 (1) 14-16 (2) 16-21 (3) 21-23 (2) 23-00 (1)	20-23 (1)
South Africa	10-12 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	05-08 (1) 12-14 (1) 14-15 (2) 15-17 (3) 17-19 (2) 19-21 (1) 21-23 (2) 23-00 (1)	19-20 (1) 20-22 (2) 22-23 (1) 21-23 (1)*
Central & South Asia	*Nil*	08-10 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-10 (1) 16-18 (1) 18-20 (2) 20-22 (1)	05-07 (1) 18-20 (1)
Southeast Asia	*Nil*	09-11 (1) 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 18-20 (1) 20-22 (2) 22-00 (1)	05-07 (1)
Far	*Nil*	08-10 (1) 14-15 (1) 15-18 (2) 18-20 (1)	18-21 (1) 21-23 (2) 23-01 (1) 06-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-14 (1)	02-05 (1) 05-06 (2) 06-07 (1) 05-06 (1)*
South Pacific & New Zealand	10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-12 (1) 12-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-09 (3) 09-12 (2) 12-17 (1) 17-19 (2) 19-22 (3) 22-02 (4) 02-04 (3) 04-07 (2)	23-00 (1) 00-02 (2) 02-05 (3) 05-07 (2) 07-08 (1) 01-03 (1)* 03-05 (2)* 05-06 (1)*
Australia	08-10 (1) 13-15 (1) 15-18 (2) 18-19 (1)	08-10 (1) 14-15 (1) 15-17 (2) 17-20 (3) 20-21 (2) 21-22 (1)	07-09 (3) 09-12 (2) 12-19 (1) 19-22 (2) 22-02 (3) 02-07 (2)	01-03 (1) 03-06 (2) 06-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-14 (3) 14-15 (4) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-12 (3) 12-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-01 (3) 01-04 (2) 04-07 (3)	18-19 (1) 19-20 (2) 20-02 (3) 02-05 (2) 05-06 (1) 20-23 (1)* 23-02 (2)* 02-05 (1)*
Brazil, Argentina Chile & Uruguay	07-10 (1) 10-13 (2) 13-14 (3) 14-16 (4) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	11-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-02 (2) 02-05 (1) 01-04 (1)*
McMurdo Sound, Antarctica	*Nil*	12-14 (1) 14-16(2) 16-19 (1)	16-18 (1) 18-20 (2) 20-00 (3) 00-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	00-05 (1)

Time Zone: PST (24-Hour Time)
WESTERN USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe	*Nil*	08-10 (1) 10-12 (2) 12-14 (1)	05-06 (1) 06-08 (2) 08-12 (1) 12-13 (2) 13-14 (3) 14-15 (2) 15-17 (1) 21-22 (1) 22-00 (2) 00-01 (1)	19-20 (1) 20-22 (2) 22-23 (1) 21-22 (1)*
Central & Northern Europe & European USSR	*Nil*	08-10 (1)	05-06 (1) 06-08 (2) 08-12 (1) 12-14 (2) 14-16 (1) 21-23 (1)	18-23 (1)
Eastern Mediterranean & Middle East	*Nil*	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 18-19 (1) 19-21 (2) 21-22 (1)	19-21 (1)

''THE NEW RTTY HANDBOOK''



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Address____________________

City__________ State________ Zip________

West & Central Africa	12-15 (1)	07-10 (1) 10-12 (2) 12-15 (3) 15-17 (2) 17-18 (1)	12-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-00 (2) 00-06 (1) 06-08 (2) 08-09 (1)	22-00 (1)
East Africa	*Nil*	08-12 (1) 12-15 (2) 15-17 (1)	12-14 (1) 14-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	19-21 (1)
South Africa	09-12 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-13 (2) 13-14 (1)	06-08 (1) 12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-21 (1) 21-22 (2) 22-23 (1)	19-21 (1)
Central & South Asia	*Nil*	08-10 (1) 16-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-19 (1) 19-21 (2) 21-22 (1)	05-07 (1)
Southeast Asia	15-18 (1)	08-10 (1) 14-16 (1) 16-19 (2) 19-20 (1)	20-00 (1) 00-02 (2) 02-03 (3) 03-06 (2) 06-08 (3) 08-09 (2) 09-11 (1) 18-20 (1)	02-06 (1)
Far East	*Nil*	08-10 (1) 13-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-21 (1)	20-22 (2) 22-00 (3) 00-03 (2) 03-06 (1) 06-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-13 (1)	01-02 (1) 02-07 (2) 07-08 (1) 02-06 (1)*
South Pacific & New Zealand	12-14 (1) 14-17 (2) 17-19 (1)	08-12 (1) 12-16 (2) 16-18 (2) 18-20 (4) 20-21 (3) 21-22 (2) 22-00 (1)	04-08 (2) 08-10 (3) 10-12 (2) 12-16 (1) 16-18 (2) 18-21 (3) 21-01 (4) 01-04 (3)	21-22 (1) 22-05 (3) 05-06 (2) 06-07 (1) 22-01 (1)* 01-04 (2)* 04-06 (1)*
Australia	13-14 (1) 14-17 (2) 17-19 (1)	08-10 (1) 13-17 (1) 17-18 (2) 18-20 (4) 20-21 (2) 21-23 (1)	12-19 (1) 19-21 (2) 21-22 (3) 22-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-12 (2)	00-01 (1) 01-02 (2) 02-05 (3) 05-07 (2) 07-09 (1) 01-03 (1)* 03-05 (2)* 05-06 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	06-07 (1) 07-09 (3) 09-11 (2) 11-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	05-08 (4) 08-10 (3) 10-14 (2) 14-16 (3) 16-20 (4) 20-00 (3) 00-04 (2) 04-05 (3)	18-20 (1) 20-00 (3) 00-02 (2) 02-06 (1) 19-21 (1)* 21-02 (2)* 02-04 (1)*
Brazil, Argentina, Chile & Uruguay	07-10 (1) 10-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	05-06 (1) 06-08 (2) 08-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-06 (1) 06-08 (2) 08-10 (1)	20-00 (1) 00-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	*Nil*	12-16 (1) 16-18 (2) 18-20 (1)	08-10 (1) 16-18 (1) 18-20 (2) 20-00 (3) 00-02 (2) 02-03 (1)	22-02 (1) 02-04 (2) 04-06 (1)

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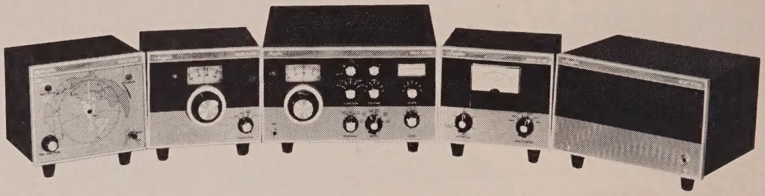

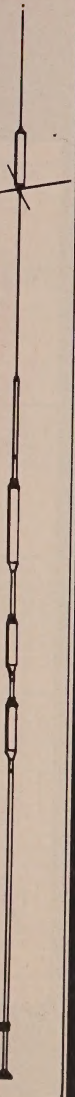

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RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

RV550A is a solid state VFO. Function switch selects the remote unit to control Receive-Transceive-Transmit frequency independently. Order No. 856 Ham Net $95.00

SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95

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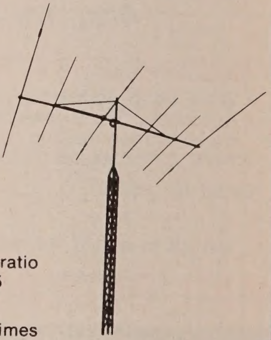

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Q AND A

BY WILFRED M. SCHERER,*
W2AEF

Rotten S.S.B. Signals

WE'RE often dismayed at the many rotten-sounding s.s.b. signals, particularly, on the 14 mc band. This involves not only splatter, but also poor unwanted-sideband suppression, poor-quality or distorted signals, excessive a.l.c., etc. Therefore, in the hopes of obtaining cooperation from s.s.b. operators, this month we'd like to offer the following suggestions toward the attainment of better-quality signals and less QRM:

1—Make sure the transmitter is properly tuned. In the case of the p.a. of an exciter or of a linear amplifier, load this stage to the point where the output starts to drop off past the loading point of maximum output (use maximum drive level at this time). This will ensure better linearity and a cleaner p.e.p. signal with less tendency toward flattopping or distortion during voice modulation (note that distortion products not only produce a poor-sounding signal, but they also deteriorate the unwanted-sideband suppression). Do not rely on the plate-current meter readings as often specified in instruction manuals. When a linear amplifier is involved, the *exciter* p.a. also must be properly tuned as described above. This should be conducted with the linear amplifier in operation, since the s.w.r. or the load as seen by the exciter often is different when the linear is or is not in operation.

2—Wherever possible monitor the r.f. output with an oscilloscope. If you do not have a 'scope, borrow one to check the approximate correct meter readings during operation. An r.f. *envelope* display is helpful, but will not indicate flattopping as well as a trapezoid display will. Although this type display is better for the purpose, when used to check a linear amplifier only (comparing the r.f. input with the output) it does not take into account the exciter which ofen flattops before the linear when high drive for the latter is required. Connect the scope up to compare the input to the *exciter* p.a. with the linear amplifier output. During modulation this also is a good way to determine if *both* the exciter and amplifier have been tuned up for linearity and to minimize flattopping.

3—In general, during voice modulation do not kick the plate-current or relative-output meter higher than about one-third the reading indicated under the maximum steady-state (d.c.) condition. Note that clean operation of a 2 kw linear often requires a meter response less than the legal maximum restriction of 1 kw.

4—Adjust the mic gain to the point where the a.l.c. meter (if provided) just starts to kick or does so slightly on occasion. Most conventional a.l.c. systems allow some degree of flattopping particularly at high a.l.c. levels. We've closely examined the a.l.c. operation on a large number of popular exciters many of which leave something more to be desired in the way of overdrive protection.

5—If you're using some form of speech procesing, such as a clipper or suppressor, hold the degree of action down to 6 db or so, or just enough to maintain a relatively uniform voice level. Excessive action may produce adverse distortion or unpleasant-sounding signals. Also note that a compressor should have a slow-release time. A fast release simply deteriorates the overall intelligibility by raising background noise in the shack (particularly from blower motors) between voice syllables. A common example of such deterioration and distraction may be observed on broadcast news interviews that are taped with a fast a.g.c.-release system.

6—Don't try to get 1 kw output from a 1 kw linear, or 2 kw from a 2 kw one. The amplifier ratings are for *input* power. Power *output* meters should kick to about 1/10-1/5 of 50-60% of steady-state *input* power.[1]

7—When a phone patch is used, include a 2500 c.p.s. low-pass filter with it.

8—If you have dentures that tend to produce "spitty" or "whistley" voice sybilants or if you have "breathy" voice quality, back off from the mic or talk "across" it.

[*Continued on page 100*]

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*Technical Director, *CQ*.

[1] See D. Horner, "SSB Power Meters: How to Read Them," *CQ*, June 1971, p. 31.

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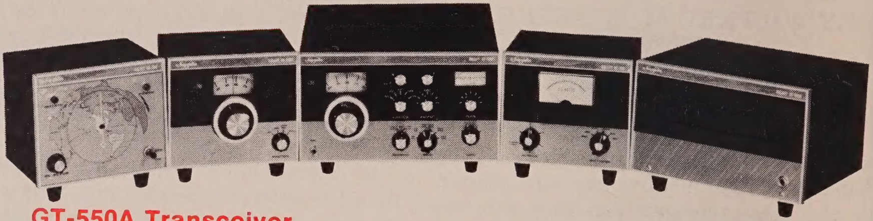

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- All new control head for Hy-Gain model 400 Rotor Brake Rotator
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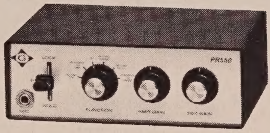
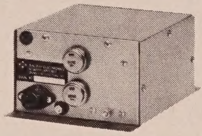


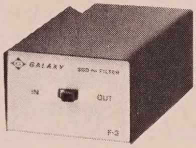
Phone Patch PR-550
Order No. 812 Ham Net $49.00

Crystal Controlled Adaptor XO-550
Order No. 811 Ham Net $49.00

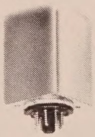
AC Supply AC-400
Order No. 801 Ham Net $99.95



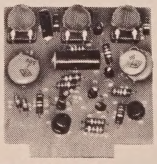
Mobile Supply G-1000DC
Order No. 802 Ham Net $129.95



CW Filter F-3
Order No. 808 Ham Net $37.50

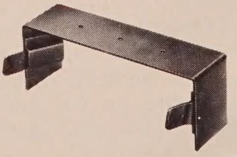


Calibrator CAL-250
Order No. 806 Ham Net $25.00



VOX Accessory VOX-35C
Order No. 807 Ham Net $29.95

Mobile Dashboard Mounting Bracket—GTM
Order No. 809 Ham Net $8.95



Floorboard Adaptor—ZZM (Not Shown)
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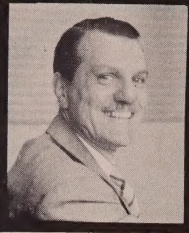

Contest Calendar

BY FRANK ANZALONE,* W1WY

Calendar of Events

Aug.	7-8	DARC WAE C.W. Contest
Aug.	7-8	Romanian Contest
Aug.	7-9	Ohio QSO Party
Aug.	14-15	Maryland/D.C. QSO Party
Aug.	21-22	QRP International Contest
Aug.	21-22	New Jersey QSO Party
Aug.	21-22	S.A.R.T.G. RTTY Contest
Aug.	28-29	All Asian C.W. Contest
Aug.	28-30	Delta QSO Party
Sept.	5-6	Nebraska QSO Party
Sept.	11-12	DARC WAE Phone Contest
Sept.	11-13	Washington State QSO Party
Sept.	11-13	FOUR Land QSO Party
Sept.	22-24	YLRL "Howdy Days"
Sept.	25-26	VE/W Contest
Oct.	2-3	California QSO Party
Oct.	2-3	VK/ZL/Oceania DX Phone
Oct.	9-10	VK/ZL/Oceania DX C.W.
Oct.	9-10	RSGB 21/28 mc Phone
Oct.	16-17	Boy Scouts Jamboree
Oct.	16-17	WADM C.W. Contest
Oct.	20-21	YL Anniv. C.W. Party
Oct.	23-24	RSGB 7 mc C.W. Contest
Oct.	**30-31**	**CQ WW DX Phone Contest**
Nov.	3-4	YL Anniv. Phone Party
Nov.	7	Czechoslovakia Contest
Nov.	6-7	RSGB 7 mc Phone Contest
Nov.	6-7	Illinois QSO Party
Nov.	13-14	ARRL SS Phone
Nov.	20-21	ARRL SS C.W.
Nov.	**27-28**	**CQ WW DX C.W. Contest**

DARC WAE Contest

C.W.—Aug. 7-8 **Phone**—Sept. 11-12
Starts: 0000 GMT Saturday
Ends: 2400 GMT Sunday

Complete rules, results of last year's contest, and the WAE country list appeared in last months CALENDAR.

Mailing deadline for your logs is Sept. 15th and Oct. 15th respectively. To: WAEDC Contest Committee, D-8950 Kaufbeuren, P.O. Box 262, Germany.

Romanian Contest

Starts: 1801 GMT Saturday, August 7
Ends: 1800 GMT Sunday, August 8

Things could get a bit complicated on this week-end. Falling on the same date as the DARC WAE contest, and a modification of the rules that now permits contacts with other European countries as well as Romania, makes it all rather confusing.

Operation is permitted on all bands, 3.5 thru 28 mc, both c.w. and phone, but cross band or cross mode contacts are not permitted.

Categories: Both single and multi-operator, and single and all band for each division.

Exchange: RS/RST plus a progressive QSO number starting with 001 regardless of band or mode. In addition YO stations will include 2 letters which identifies their county.

Points: Each European QSO counts two points, 10 points if its with a YO station.

Multiplier: Each European country and each YO county worked on each band.

Final Score: The sum of QSO points multiplied by the total multiplier from each band. (Mobile and portable stations are given a bonus of 1.5 to be multiplied by their final score.)

Logs: Use a separate sheet for each band or mode and fill in multiplier column *only* the first time a new country or county is worked. A summary sheet showing the scoring, equipment description, a signed declaration and your name and address in BLOCK LETTERS is also requested.

Awards: Certificates to the top scorers in each country and each classification. And a Crystal Cup to the over-all champion.

Mailing deadline is Sept. 1st to: Romanian Amateur Radio Federation, P.O. Box 1395, Bucuresti 5, Romania.

Ohio QSO Party

Two Periods: (GMT)
1900 Sat. Aug. 7 to 0300 Sun. Aug. 8
1500 Sun. Aug. 8 to 2300 Mon. Aug. 9

This one is going to run into some tough competition, what with the DARC and YO contests on the same week-end.

Each station may be worked once per band per mode, and Ohio stations may contact in-state stations.

Exchange: QSO nr., RS/RST and QTH. County for Ohio, ARRL section or country for others.

Scoring: 1 point per QSO on 80-20 meters, 2 points on 15-10, and 3 points on 160 & v.h.f. Multiply total by ARRL sections for Ohio stations, or Ohio counties for out-of-state. (max. 88)

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*14 Sherwood Road, Stamford, Conn. 06905

Frequencies: C.W.–3540, 7040, 14040, 21040, 28040. s.s.b.–3985, 7285, 14285, 21385, 28585, 1805. v.h.f.–50.15, 52.525, 145.4, 145.94/88. Novice–3735, 7185, 21135. (Try 160 at 0200 on Sun. Aug. 8)

Awards: To 1st, 2nd, 3rd to top Ohio and out-of-state scorers. And 1st in each ARRL section and country. Also to Novice and v.h.f. stations only.

Logs go to Treaty City ARA, Att. Scott A. Lehman, WA8TGX, P.O. Box 91, Greenville, Ohio 45331. Include a #10 s.a.s.e. for results. Your QSL's may be sent to same address.

Maryland/D.C. QSO Party

Starts: 2200 GMT Saturday, August 14
Ends: 2200 GMT Sunday, August 15

The 6th MD/DC QSO Party is again sponsored by the Maydale ARC. A station may be contacted on each band and mode. Separate logs must be submitted for each mode.

Exchange: QSO nr., RS/RST and QTH. County for MD/DC, ARRL section or country for all others. (Baltimore and Wash. DC. count as separate counties.)

Scoring: Two points for each completed QSO. MD/DC use ARRL sections and countries for their multiplier, out-of-state stations use Maryland counties. (max. of 25)

Frequencies: C.W.–3575, 7075, 14075, 21075. Phone–3920, 7275, 14275, 21325. Novice–3735, 7175, 21110. Tech.–50.175, 145.175.

Awards: Certificates to the top scorers in each ARRL section, country and Maryland county, both on c.w. and phone. Additional awards where returns warrant.

Logs: Should show date/time in GMT, QSO nr., station worked, RS/RST sent and received and QTH. A summary sheet with name and address in BLOCK LETTERS and a signed declaration that all rules and regulations have been observed is also requested.

Mailing deadline is Sept. 15th to: Carl E. Andersen, K3JYZ, 14601 Claude Lane, Silver Spring, Md. 20904. Include s.a.s.e. if copy of results is desired.

ARCI QRP QSO Party

Starts: 2000 GMT Saturday, August 21
Ends: 2400 GMT Sunday, August 22

This contest is open to all amateurs whether or not they are members of QRP ARC International, and are eligible for awards.

Exchange: RS/RST, ARRL section or country, and QRP number for members. Non-members use "NM" and power input.

Scoring: Each QRP member worked counts 3 points, 4 points if its a DX member. Non-member QSO's count 2 points. The multiplier is determined by the ARRL sections and countries worked on each band. The same station may be worked on each band for QSO and multiplier credit.

George Craiu, YO3RF is very active and well known in Romanian amateur radio affairs. He is a QCWA member and also of the newly formed DX Old Timers' Club. To qualify for the DXOTC you must have at least 25 years of ham activity and have 250 confirmed countries. For information write to IT1TAI, Box 143, Palermo, Sicily, Italy.

There is also a power multiplier as follows: Over 100 watts input, no multiplier. 25 to 100 × 1.5; 5 to 25 × 2; 1 to 5 × 3; and less than 1 watt × 4. (PEP double)

Final Score: QSO points × Multiplier × Power multiplier.

Frequencies: C.W.–3540, 7040, 14065, 21040, 28040. s.s.b.–3980, 7280, 14330, 21430, 28600. Novice–3710, 7160, 21120.

Awards: Certificates to highest scoring stations in each ARRL section and country. Also to three top W/VE and DX stations. The lowest power station with at least 3 skip QSO's will also be rewarded.

A summary sheet with equipment description and declaration is also requested.

Mailing deadline is Sept. 15th to: Elmer J. Worth, K3YNN, 946 Franklin St., Reading, Pa. 19602. A s.a.s.e. to K3YNN will also get you information regarding ARP ARC.

New Jersey QSO Party

Two Periods:
1900-0600 GMT Sat./Sun. Aug. 21/22
1200-2300 GMT Sunday, August 22

This is the 12th party sponsored by the Englewood ARA. Phone and c.w. are considered part of the same contest, the same station may be worked on each band and mode, and N.J. stations may work in-state stations.

Exchange: QSO nr., RS/RST and QTH. County for N.J., and ARRL section or country for all others.

Scoring: *For N.J.*–US/VE contacts 1 point, DX 3 points. Multiply total by ARRL sections worked. (max. of 74) *Out-of-state*–Multiply number of N.J. contacts by N.J. counties worked (max. of 21)

Frequencies: 1810, 3555, 3740, 3930, 7060, 7275, 14075, 14280, 21100, 21375, 28800 and 50-50.5, 144-146.

Awards: Certificates to top scorers in each N.J. county, ARRL section and country. Novice and Technician will also be awarded.

Stations planning active participation in New Jersey are requested to advice EARA by August 7th so that coverage of all counties may be planned.

Logs must be received no later than Sept. 18th by the Englewood ARA, 303 Tenafly Road, Englewood, N.J. 07631. Include a large s.a.s.e. if results are desired.

S.A.R.T.G. RTTY Contest

Starts: 1500 GMT Saturday, August 21
Ends: 1800 GMT Sunday, August 22

This is the 1st RTTY Contest run by the Scandinavian Amateur Radio Teleprinter Group.

Use all bands 3.5 thru 28 mc, the same station may be worked on each band for QSO and multiplier credits. There are 2 classes, single and multi-operator.

Exchange: QSO nr., and signal report.

Points: QSO with own country, 5 points. Other countries but same continent, 10 points. Other continents, 25 points. QSO's with Scandinavians have *double* value.

Multiplier: Each country worked and each district in W/K, VE/VO, PY, LU, VK, ZL and JA. Use the DXCC and WAE country lists.

Final score: Sum of QSO points times the multiplier from each band.

Awards: Certificates to the two top stations in each class, in each country and above call districts.

All QSO's with Scandinavians are valid for the WSRY award, and points and position achieved in the contest may be included in the 1971 World RTTY Championship.

Mailing deadline is Sept. 20th to: S.A.R.T.G. Contest, Att: Bo V. Ohlsson, SM4CMG, Box 1258, S-710 41 Fellingsbro, Sweden.

All Asian DX C.W. Contest

Starts: 1000 GMT Saturday, August 28
Ends: 1600 GMT Sunday, August 29

This is the 12th annual contest sponsored by the JARL with same rules as last year.

The exchange will be between Asian Countries and the rest of the world, on all bands 1.8 thru 28 mc, on c.w. only.

Classifications: Single operator, single band and all band; multi-operator, single transmitter all band only.

Exchange: For OM's, five figures, RST plus your age. For YL's, RST plus 00.

Scoring: One point per QSO. Asians use non-Asian countries for their multiplier. (ARRL DXCC list) Non-Asians will use prefix of Asian countries as their multiplier. (*CQ* WPX list) Note: JD1, Ogasawara Is. (Bonin & Volcano) are in Asia. Minamitorishima (Marcus) is in Oceania.

Final Score: For Asians, sum of contacts on each band multiplied by the Country multiplier from each band. For non-Asians, sum of contacts on each band multiplied by the Prefix multiplier from each band.

Awards: To the highest scoring station as follows: Single operator, all band—Certificate and plaque with medal in each continent. And 1st, 2nd and 3rd place certificates in each country, and 1st for each USA call area.

Single operator, single band—Certificate and medal in each continent. And 1st place in each country on each band.

Multi-operator, all band only—Certificate and plaque with medal in each continent. And 1st place certificate in each country.

Logs: Keep all times in GMT, fill in country or prefix column *only* first time it is worked and use a separate sheet for each band. A summary sheet is a must, show the scoring and other pertinent information, and a signed declaration that all rules and regulations have been observed.

Things to remember, non-Asian stations will use prefixes for their multiplier. Multi-operator stations are restricted to single transmitter operation, contacts on different bands at the same time are prohibited. (Club stations come in this catagory) Each operator will give his age in the exchange when he is operating. Contacts with KA stations are not permitted.

Disqualification: Violation of the regulations in the country of the contestant, or the rules of the contest, or unsportsmanship conduct, or taking credit for incorrect QSO's or multipliers, or duplicate contacts in excess of 2% of the total made, will be deemed cause for disqualification. The Committee's decision shall be final in all disputes.

Logs must be *received* no later than Nov. 30th and go to: J.A.R.L. Contest Committee, Central Post Office Box 377, Tokyo, Japan. Include 1 IRC for copy of results.

Delta QSO Party

Starts: 2000 GMT Saturday, August 28
Ends: 0200 GMT Monday, August 30

This is the second annual QSO party sponsored by the Delta Division of the ARRL. Delta stations (Ark., La., Miss., Tenn.) may work stations both in and outside their boundries, others only Delta stations. The same station may be worked on each band and mode, and mobiles each county change.

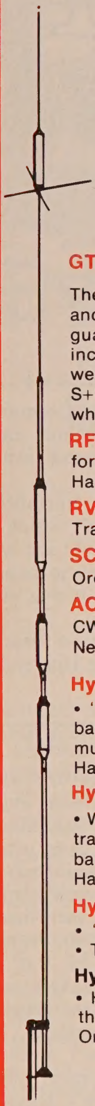
Exchange: QSO nr., RS/RST and QTH. County/state for Delta, ARRL section for all others.

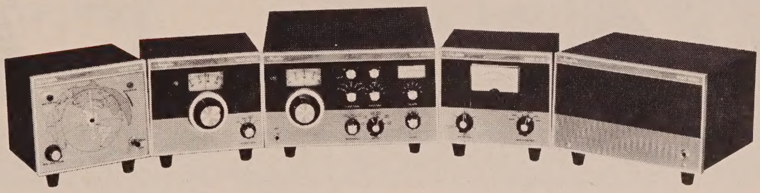
Scoring: For Delta, QSO's times ARRL sections worked. (max. 75) Outside Delta QSO's times Delta counties. (Max. 316) DX stations may be worked for QSO points only.

[*Continued on page 102*]

THE GALAXY 550A

MORE POWER, MORE FLEXIBILITY FOR THE Fixed Station...





GT-550A Transceiver Order No. 855 Ham Net $495.00

The GT-550A is the best transceiver on the market for the money. Bar none. Costs just $495.00 and delivers 550 watts of power. Operating either fixed station or mobile, this transceiver is guaranteed to have a top frequency stability after warm-up. We're so proud of the stability we include a graph with each GT-550A showing the purchaser how stable his radio was when it went through final check. 550 watts SSB; 360 watts CW; sensitivity better than .5 uv for 10db S+N/N; stable—45db carrier suppression; 25 KHz calibrator and vox option; no frequency jump when you switch sidebands.

RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

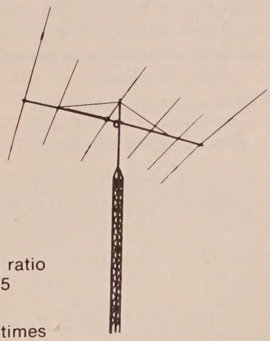
RV550A is a solid state VFO. Function switch selects the remote unit to control Receive-Transceive-Transmit frequency independently. Order No. 856 Ham Net $95.00

SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95

Hy-Gain's *Super Thunderbird* TH6DXX

• "Hy-Q" Traps • Up to 9.5db forward gain • 25db front-to-back ratio • SWR less than 1.5:1 on all bands • Takes maximum legal power • 24-foot boom. Order No. 389 Ham Net $179.95



Hy-Gain's 18 AVT/WB

• Wide band performance, 80 through 10 meters • Three Hy-Q traps • Top loading coil • True 1/4 wave resonance on all bands • SWR of 2:1 or less at band edges. Order No. 386 Ham Net $59.95

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• Handles large beams and stacked arrays with ease—up to 10 times the mechanical and braking capability of any rotator on the market. Order No. 400 Ham Net $189.95

DOUGLAS ELECTRONICS

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THE awards PROGRAM

BY ED HOPPER,* W2GT

Special Honor Roll
All Counties
#55–Ed Eastwold, WA0SBR 4-22-71.

USA-CA HONOR ROLL

3000	
W9DRL	74
K3LXN	75
WA0SBR	76
2500	
W4SWW	105
WA0SBR	106
2000	
WA0SBR	131
1500	
WA0SBR	163
K1OAZ	164
1000	
W4RNL	236
WA0JCE	237
WA0SBR	238
K1OAZ	239
500	
W2PDB	846
DJ4OJ	847
WA0RKR	848
GD3GMH	849
WA0SBR	850
K1OAZ	851

THE August, "Story of The Month" is:

Ed Eastwold, WA0SBR

Entry into this world was made during "The Roaring Twenties" and although Ed arrived on Halloween, he insists he was not delivered by a witch riding on a broomstick. The locale was a small rural town in S.W. Minnesota.

His Dad is a dentist and has been practicing over 50 years in Minnesota, and his brother is a medical missionary in the Camerouns in Africa.

After graduating from high school in 1943, he followed in the footsteps of just about every male that was 18, could stand on one leg, and could see out of one eye–he entered the service. As Ed could stand on 2 legs and could see out of both eyes, he landed in the infantry, K Company, 398th Regiment of the 100th Infantry Division.

Ed Eastwold, WA0SBR and mobile set-up.

After seeing action in France and Germany, when the war ended, the Army figured they could get along without his services and turned him loose to readjust to civilian life.

While attending Olaf College in Northfield, Minnesota, Ed met his XYL "Hap", which is short for "Happy". It seems as a child she was always smiling and always appeared so happy that everyone called her "Happy"–it was this infectious smile that captured Ed.

Wedding bells followed 2 years later and at that time a transfer was made to the University of Minnesota College of Pharmacy.

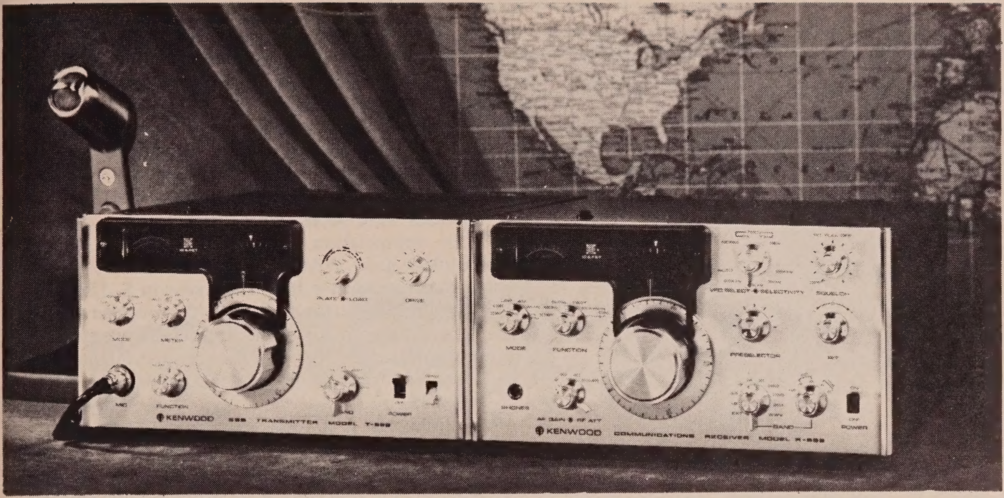
Eight years and 3 harmonics later, Ed struck out on his own and bought a drugstore in Sioux Falls, S. Dakota.

His oldest harmonic, Mark, WA0PJF, who just completed his 3rd year in electrical engineering at S. Dakota University, is responsible for getting Dad into amateur radio. Even when very young, Mark seemed quite fascinated in taking things apart to see how they were made, unfortunately he usually did not put them back together. When someone introduced him to the wonderful world of amateur radio he was in his glory–oh so many new things to take apart. Also the idea of making contact with individuals all over the country aroused his curiosity. In short order he got his Novice license.

Although Ed is not an overly curious individual, he was intrigued with Mark's Novice contacts on c.w. and he started wondering if someone on the "shady" side of 40 could ever learn code, much less the technical aspect of amateur radio. He discovered it was possible and in no time he was "hooked". A Novice

---

*P.O. Box 73, Rochelle Park, N.J. 07662.



KENWOOD

...the value line of the 70's

R-599 SOLID STATE RECEIVER AND T-599 HYBRID TRANSMITTER OFFERS UNIQUE FEATURES, SUPERB PERFORMANCE, HIGH STYLE...THE ULTIMATE IN VALUE

THE R-599 RECEIVER: 1.8 to 29.7 MHz (amateur bands) ● .5 microvolt sensitivity nominal ● Dial readout to ½ kilocycle ● Special detectors for SSB, AM, and FM ● Transceive operation with T-599 ● Built-in 100 kc and 25 kc crystal calibrator ● Built-in 500 cycle CW filter ● Provision for 2 and 6 meter coverage with optional accessory self-contained converters ● Adjustable threshold squelch ● The price . . . only $298.00

THE T-599 TRANSMITTER: Clear, stable, selectable sideband, AM and CW ● 4-way VFO Flexibility plus Receiver Incremental Tuning (RIT) when used with the R-599 ● Amplified ALC ● Built-in VOX ● Full metering, including cathode current, plate voltage, ALC and relative Power Output ● Built-in CW Sidetone monitor and semi-automatic break-in CW ● Built-In power supply ● Maximum TVI protection ● Employs only 3 vacuum tubes ● The price . . $345.00

S-599 speaker $14.50 ● CC-29 2 meter converter $29.50 ● CC-69 6 meter converter $29.50. ●

KENWOOD IS AVAILABLE FROM ONE OF THE FOLLOWING SELECT DEALERS:

HENRY RADIO 11240 W. Olympic Blvd., Los Angeles, Ca. 90064 477-6701 • 931 N. Euclid Ave., Anaheim, Ca. 92801 772-9200 Butler, Mo. 64730 679-3127

ADIRONDACK RADIO SUPPLY 185 W. Main St., Amsterdam, New York 12010 842-8350

ALLIED RADIO SHACK 230 S. Main Street, Lombard, Illinois 60148 495-1234

AMATEUR ELECTRONIC SUPPLY 4828 W. Fond du Lac, Milwaukee, Wis. 53216 442-4200

AMATEUR RADIO CENTER 2805 N.E. 2nd St., Miami, Florida 33137 374-4101

AMATEUR RADIO SUPPLY 6213 13th Ave. S., Seattle, Wash 98108 767-3222

STAN BURGHARDT 315 10th Ave. N.W., Watertown, S.D. 57201 886-3767

COMMUNICATIONS WORLD 4788 State Road, Cleveland, Ohio 44109 398-6363

DERRICK ELECTRONICS 108 E. El Paso, Broken Arrow, Okla. 74012 251-9923

DOUGLAS ELECTRONICS 1118 S. Staples, Corpus Christi, Texas 78404 883-5103

ELECTRONIC CENTER 107 3rd Ave. N., Minneapolis, Minn. 55401 338-8461

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FRECK RADIO & SUPPLY 38 Biltmore Ave., Asheville, N.C. 28801 254-9551

HAM RADIO CENTER 8342 Olive Blvd., St. Louis, Mo. 63132 993-6060

HAM RADIO OUTLET 999 Howard Ave., Burlingame, Ca. 94010 342-5757

INDUSTRIAL DISTRIBUTORS 1209 S. Industrial Ave., Dallas, Texas 75207 742-8570

JRS DISTRIBUTORS 646 W. Market St., York, Penn. 17404 854-8624

KASS ELECTRONICS 2502 Township Line Rd., Drexel Hill, Penn. 19026 449-2300

MADISON ELECTRONICS 1508 McKinney Ave., Houston, Texas 77002 224-2668

PORTLAND RADIO SUPPLY 1234 S.W. Stark St., Portland, Or. 97205 228-8647

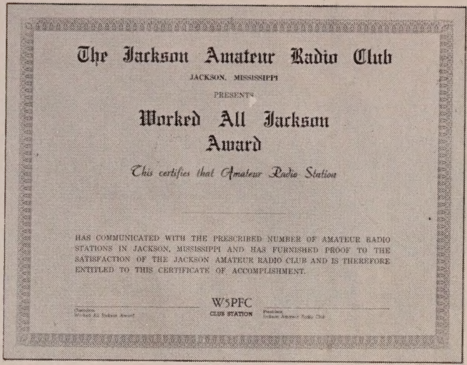
RADIO DISTRIBUTING CO., INC. 1212 High St., South Bend, Indiana 46624 288-4666

RADIO SUPPLY & ENGINEERING CO. 85 Selden Ave., Detroit, Michigan 48201 831-3175

STATE ELECTRONICS 36 Route 10, Hanover, N. J. 07936 887-2550

WESTERN RADIO 1415 India St., San Diego, Calif. 92101 239-0361

WORLD RADIO LABS 3415 W. Broadway, Council Bluffs, Iowa 51501 328-1851



The Jackson Amateur Radio Club

JACKSON, MISSISSIPPI

PRESENTS

Worked All Jackson
Award

This certifies that Amateur Radio Station

HAS COMMUNICATED WITH THE PRESCRIBED NUMBER OF AMATEUR RADIO STATIONS IN JACKSON, MISSISSIPPI AND HAS FURNISHED PROOF TO THE SATISFACTION OF THE JACKSON AMATEUR RADIO CLUB AND IS THEREFORE ENTITLED TO THIS CERTIFICATE OF ACCOMPLISHMENT.

W5PFC
CLUB STATION

Worked All Jackson Award.

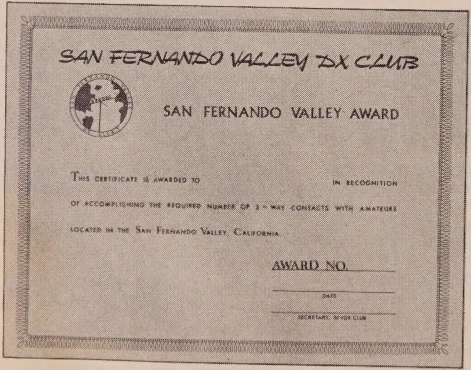
license was obtained in July 1967 and 3 months later a General license put him on the phone bands.

Mark and Dad did their Novice work on an ancient Globe Chief and when Mark passed his General, a Swan 240 was obtained.

Shortly Ed heard about county hunting. Although by that time, 5 operators had already worked All USA Counties–it still seemed impossible.

During a QSO with K0DEQ, Ed got the full story on County Hunting. It seemed to him that a person just had to be "Off his Rocker" to attempt such a thing *(and he still feels that way, Hi!)*.

Losing his 20 meter vertical in an ice storm forced Ed to finish that winter on 75 meters. Acutally this was a "Blessing in disguise" and some of the fondest memories cover that first winter on 75. He calls it The Winter of Armand, the Gold Dust twins and the Winnemucca Kid. That, of course, would be VE7BWU (now VE7-AYL), Irene, WA9EZP and Helen, WA3GLU and Don, WB5DRU who was then WA9PRE/7 in Winnemucca, Nevada. Nearly every night when the 75 meter net slowed down, they would rag chew until the wee hours, often the sun came up before they would call it quits.



SAN FERNANDO VALLEY DX CLUB

SAN FERNANDO VALLEY AWARD

THIS CERTIFICATE IS AWARDED TO IN RECOGNITION OF ACCOMPLISHING THE REQUIRED NUMBER OF 2 – WAY CONTACTS WITH AMATEURS LOCATED IN THE SAN FERNANDO VALLEY, CALIFORNIA.

AWARD NO.

DATE

SECRETARY, SFVDX CLUB

San Fernando Award.

At any rate, Ed was off and running for his quest of All Counties!

Every facet of amateur radio was intriguing, and mobiling was no exception. His Olds Vista-cruiser was rigged for mobile operation in the Sprng of 1968 and many of those rare S. Dakota counties were soon relatively common.

In appreciation for all the counties other mobilers gave WA0SBR, Ed has tried to make 2 extensive mobile trips each year in S. Dakota, covering approximately 30-40 counties each time. Although his work keeps him pretty tied down, extensive driving has been difficult, but counties in 9 states have been given out. One big pleasure was being able to give Arnie, W8-DCD his last 4 counties to join that select group (All Counties #25, April 6, 1970).

After reaching the 3000 level, and things nearly came to a halt, a 20 meter dipole was set up on the roof of the drug store. Thus during the daytime he was able to monitor the mobile net and work a few new ones between filling prescriptions.

After about 4 months of "drugstore county hunting", his needs narrowed down to Stevens and Pratt in Kansas.

Acknowledging his plight, Don, WA0JRZ decided to go out and get them for Ed. Stevens is in the S.W. corner of Kansas next to the Oklahoma border so it seemed that 20 meters would be ok for the particular time of the day. However, to be on the safe side, the car with the mobile rig was driven to work that day so 40 meters would be available.

Conditions turned bad and as Don traveled westward across Kansas it was just about impossible to read him. When Don hit Stevens County he was still not readable so the net was asked to inform him that Ed would go to his car and work him on 40 meters.

What a shock to find the car missing from the parking lot. A phone call to home brought to light the fact that his daughter Mary had taken the car. A quick phone call to Mark to get the other car and rush to the airport, where Mary works, and swap cars and bring the mobile car to the drugstore.

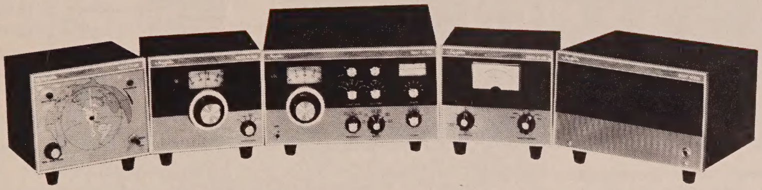
In the meantime attempts were made to break the 20 meter net to get someone to go to 40 meters to explain the delay to Don. While waiting, Ed tuned the Swan 240 to 40 on the 20 meter dipole and there was Don asking WA0MQM to call WA0SBR again, they were not aware of the problem–so Ed called with 120 watts to the 20 meter dipole and made it!

Getting Pratt county, the last one, on 75 that night was almost anticlimactic as signals were 5-9 both ways with good conditions.

Intentions are to hang the Plaque in the drug store so the customers will know what all that noise was about, in the back room!

THE GALAXY 550A

MORE POWER, MORE FLEXIBILITY FOR THE Fixed Station...



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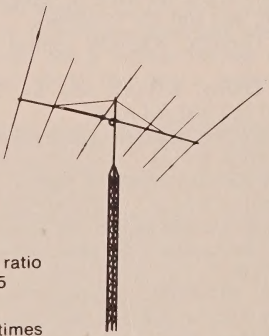

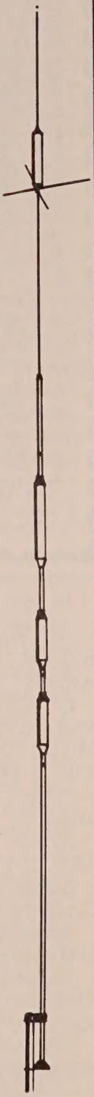

Hy-Gain's *Super Thunderbird* TH6DXX

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Awards Issued

Joe Slattery, W9DRL and Steve Johnson, K3LXN were issued USA-CA-3000 Mixed Awards.

Ed. Eastwold, WA0SBR held off until he had knocked them all off and received All Counties Mixed; 3000 and 2500 All 2 × SSB; and 2000, 1500, 1000, and 500 All 75 Meters.

"Ukie" Urquiza, W4SWW applied for 2500 Mixed.

Arthur Dority, K1OAZ sent for USA-CA-1500, 1000 and 500 All A3A.

LeRoy Cebik, W4RNL qualified for USA-CA-1000 All A-1.

Loren McGinnis, WA0JCE won a USA-CA-1000 Mixed.

Mixed 500 Awards went to Ed. Nadolny, W2-PDB; Rex Richardson, WA0RKR; and Werner Katte, DJ4OP.

Jeff Holt, GD3GMH (Brother of Bob, GW3-NWV, his QSL manager) was issued a 500 Award endorsed All Phone and #1 to GD.

Awards

Worked All Jackson Award: The Jackson Amateur Radio Club of Jackson, Mississippi is re-activating this award. Requirements: Stateside/VE work 5 Jackson Area stations or 3 club members. DX stations work 2 Jackson Area stations or 1 club member. There is no date nor time limit, all valid contacts count. Send QSL's or GCR list. The Jackson area includes all towns within 40 miles of Jackson proper. Cost: $1.00 for W/K and free to all others. Apply to Award Custodian: Mr. J. L. Lay, WA5SKP, Rt. 2, Box 277-A, Florence, Mississippi 39073.

San Fernando Valley Award: Issued to any Foreign Amateur who submits proof of contacts with stations located in ten different San Fernando Valley, California communities. Then upon working any additional communities, an endorsement sticker is awarded. A final endorsement sticker will be issued after all the Valley communities (28) have been worked. QSL's for this award should be submitted to: San Fernando Valley DX Club, P.O. Box 1373, Reseda, California, 91335. IRC's are not required. The San Fernando Valley is 20 miles long and 10 miles wide and is located in the northwestern section of Los Angeles. It is estimated that 3,500 of the one million residents are licensed amateurs.

Notes

Although I have about run out of space I'd like to say that I hope those who could attend, had a GREAT time at Kansas City the 4th of July week-end and for those who could not make it, I'll be happy to pass along data and photos when I get them. Please remember my deadline is now 90 days.

How was your month?, 73, Ed., W2GT.

SURPLUS sidelights

BY GORDON ELIOT WHITE*

LIBERALIZATION expected by the Federal Communications Commission of amateur radio teleprinter rules to permit speeds other than the standard 60 words per minute, may add confusion to the RTTY scene, but amateurs will undoubtedly turn to surplus equipment to use to handle the new speeds in the next few months. In this column I want to review the speed situation, and some of the different speed-changing devices available.

To use speeds higher than 60 w.p.m., the more recent model 28 RTTY gear will become more popular since the older model 14, 15 and 19 sets were designed for slow-speed operation, and do not hold up well when run faster. It is possible to gear the old equipment up to turn 100 w.p.m., but particularly the model 15 and 19 page printers do not last long at 100 speed. The model 14 typing reperforator will do a little better, but still hops around when forced to run at 100 speed. The model 14 transmitter-distributor appears to serve adequately at 100 w.p.m., as does the model 14 non-typing reperforator, if kept well-oiled.

The older machines will run at 67 or 75 w.p.m. with a gear change, and it appears likely that most amateurs with the older equipment will want to go to 75 w.p.m., which is a common U.S. commercial speed of a few years ago. The 75-speed gears are still manufactured by Teletype Corp., and among other amateur dealers who stock them is Lionel Van't Slot, 302 Passaic Ave., Stirling, N.J.

To take full advantage of the new speed rules, once they take effect, amateurs and RTTY s.w.l.'s will move into the model 28 and 32, and certain MITE and Kleinschmidt machines, designed for the higher speed. (The Model 33 and 35 equipment, currently produced for 100 w.p.m. operation, use 8-level ASCII code, *not compatible* with amateur 5-level Baudot code)

To my knowledge, only the Teletype Model 28 equipment offers quick-change speed shift options on teleprinter gear. There are exotic sets like the $4,000 Kleinschmidt 311, which can be shifted electronically, but standard Kleinschmidt and Mite equipment can be changed in speed only by stopping the machine, removing the gears, and substituting other gears. The Teletype Model 32 likewise requires substitution of a new gear to alter its speed.

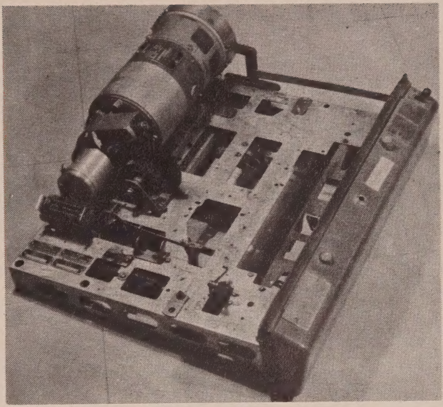

Fig. 1—The base for the #28 receive-only Teletype set, showing the variable-speed governed motor. Speed is changed from the front, using the small lever on the right end of the cover plate. The tachometer mounted on the left end of the motor shaft can be used to set the speed by plugging a calibrated voltmeter into the jack on the front of the unit. The variable speed kit can also be used on the keyboard Model 28.

Older equipment, and Model 28 sets with governed motors, can be adjusted to run at higher speeds, but a gear change is usually required for more than a few r.p.m. in speed difference. One exception is the Model 28 LMU-10, a variable governed motor that can be adjusted with a front-panel lever while it is running. You can slow the LMU-10 down to well under 60 w.p.m., or run it at more than 100-speed. A tachometer generator used with the motor puts out a voltage varying directly with the shaft speed, and thus a properly-cali-

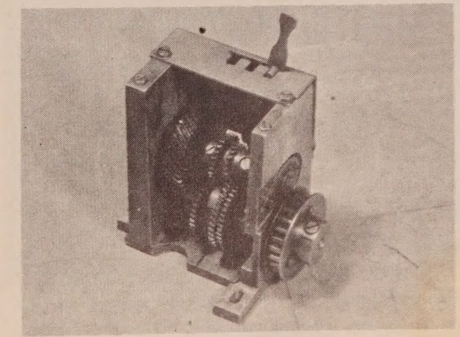

Fig. 2—The gear shift mechanism for the Model 28 receive-only typing reperforator. Different shifts are available for 60-75-100 w.p.m. or 60-67-75 words per minute.

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*5716 N. King's Hgwy., Alexandria, Vir. 22303

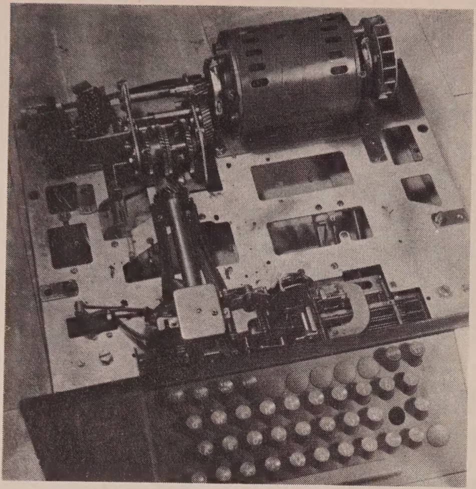

Fig. 3—Mechanical 60-75-100 w.p.m. shift for the Model 28 KSR Teletype set. This is the only KSR shift available, although other more expensive shifts can be adapted to the KSR for 60-67-100 w.p.m.

brated voltmeter can be used to set the speed accurately.

Fig. 1 shows a model 28 receive-only set with the variable-speed motor and tachometer generator. These modification kits are priced at more than $200, and are rather rare in surplus. They were used by certain intelligence agencies for monitoring non-standard teleprinter signals, and the specification data is considered classified, though the equipment is shown in the Teletype parts books.

Another, cheaper, alternative, is to use a silicon-controlled rectifier motor speed control to vary the speed of a governed motor. (this will not work with a synchronous motor, which is designed to stay in synchronism with the frequency of the power line. It may run slower than synch speed, if overloaded or if supplied with low-voltage, but it will overheat badly if allowed to run long out-of-synch.)

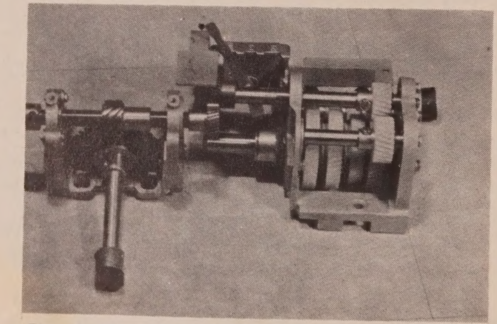

Fig. 4—The gear shift to change speeds for the entire Model 28 ASR set. This Nylon gear transmission is quite expensive. As shown, it offers 60-67-100 w.p.m., but 60-75-100 w.p.m. gears may be mounted in the same frame. This changes speeds for the transmitter-distributor and the keyboard reperf as well as the printer.

The SCR speed control however, has no feedback; You can set it to run at a given speed by varying the voltage provided to the series motor, but in one method suggested, in which the governor contacts are discarded, there is no way of varying the voltage with a changing load. The load on a teleprinter at rest, motor on but receiving no signal, is appreciably less than the load during the printing cycle. The SCR does not increase the voltage with increasing load, so the motor slows down, throwing off the machine speed. Depending on the speed setting, this can throw in enough bias to make the unit print garble. At the best, it degrades the ability of the printer to receive correctly. Some of my correspondents have observed that SCR-controlled motors will work, but clearly slow down and speed up as the load is increased or reduced during printing.

The feedback problem could be solved by a device that increased the voltage as the motor speed decreased—this is the function of the governor contacts in the standard series-wound Teletype motors. It has been suggested that the tachometer from the LMU-10 might be used—or some other generator—to give instantaneous speed information for an electronic speed-control based on the SCR. For a circuit using the SCR without feedback, see *RTTY Journal*, April, 1971 p. 13.

But the most commonly-used speed change device for RTTY (other than using a screwdriver to swap gears) is the quick-change gearshift. There are several different shifts, all for the model 28. Virtually all types of #28 equipment can be adapted to gear shifts—printers, transmitter-distributors, reperforators, etc.

The receive-only reperforator (fig. 2) is often furnished to the military services with a 60-75-100 w.p.m. shift. A few rare units have 60-67-75 speed shifts. A single-speed reperf can have the gearshift added using modification kit 159417. List price from Teletype is $83.30 plus tax and shipping.

The standard model 28 Keyboard-Send-Receive page printer (fig. 3) can be furnished with a 60-75-100 w.p.m. shift (mod. kit 162241, price $184.00) using steel gears, or with a more costly kit using nylon gears. For 60-67-100 speeds, the nylon shift is required, as no 67 speed steel gear shift is offered. The heavier nylon-geared shift unit lists at more than $200, and is not available as a mod kit, but as separately-ordered parts.

The same shift can of course be used on receive-only printers. It can be installed on the printer section of the big model 28 Automatic

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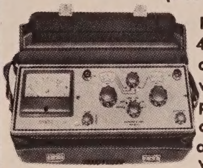

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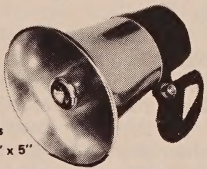

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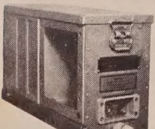

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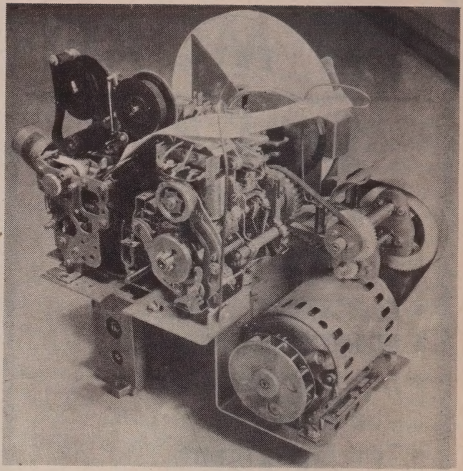

Fig. 5—The Model 28 receive-only typing reperforator on a mount that will enable it to be installed in the "dome" of the 28 ASR set. It can be equipped with a gear shift as well.

Send-Receive set (see *CQ* Feb. 1967 p. 92) but it will only shift the printer and keyboard, not the perforator and TD. To install it requires minor modifications in the ASR keyboard.

To change the entire ASR set, including the TD and the keyboard-operated reperforator, a larger shift kit is required, such as 195154 ($216) for 60-67-100 w.p.m. operation. (to operate this at 60-75-100 w.p.m. requires some substitution of gears from another shift) See fig. 4.

The auxiliary reperf used in some ASR sets (fig. 5) can also be furnished with a gear shift for 60-67-100 or 60-75-100 operation. The unit shown has single-speed gears.

To alter the speed of the model 28 transmitter-distributor, there are both 60-67-100 and 60-75-100 w.p.m. kits. Fig. 6 shows the TD and the shift kit, not yet installed. This kit lists at $187, and is rare indeed in surplus, as it was produced for a Navy contract, and few were sold.

Other speed shifts are available, in surplus and new, for the keyboard reperf, and for the #28 R-T sets. The latter are units containing a reperforator and a transmitter. Either end or both can be equipped with gear shifts. With the set you can receive at one speed, store up to a few hundred feet of tape, and transmit at another speed. If the output is slower, the tape loop acts as a buffer, to store the input data until the output can accept it. This could be used, for example, with a 60 w.p.m. #15 to receive 100 speed copy. Hook the receiving demodulator to the 100 speed reperf, and set the transmitter to 60 w.p.m. (see *CQ* May 1967 p. 90).

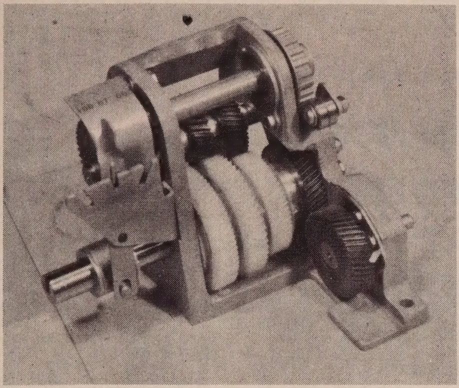

Fig. 6—The gear shift for 60-67-100 w.p.m. operation of the independent #28 transmitter-distributor Since 67 w.p.m. is compatible with European speeds, and 75 w.p.m. is a less-used U.S. commercial speed, this is probably the optimum choice of speeds, for use when the FCC allows higher speed amateur RTTY.

Perhaps the most elegant speed converter is the electronic one. To use this device the printer is set on the highest desired speed, (probably 100 w.p.m.) and the various different signal rates received are electronically speeded up to match the printer. I suggested applying the otherwise useless AN/FGC-5 multiplex set to that service in this column in September, 1969 (p. 82). More recently, amateurs have built speed converters using inexpensive integrated circuits (see *RTTY Journal,* April 1971 p. 3).

It is possible to use shift registers to read in the serial TTY signal and convert it to parallel mode, at a slow speed, then using a 100 w.p.m. "clock" speed, to read out at the higher speed. The actual printing of each character is done at a speed of 100 w.p.m. but of course the copy will only be received at the overall speed at which it is sent. Sixty-speed prints on a 100 w.p.m. machine in a "...bit...bit..." pattern.

It is possible to *receive* at 100 wp.m. and *print out* at 60 only if you have some way of storing the overrun through either solid-state or magnetic tape storage, or on perforated tape storage, as in the R-T set. Federick Electronics Corp., Frederick, Md., makes an electronic speed converter and buffer storage unit, model 1300, priced in the $3,000-$4,000 range. ■

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CR6GA	2,982,980	2806	106	258

Kerguelen Is.

FB8XX	191,052	408	62	112

ASIA

India

VU2BEO	523,404	758	98	181

Iran

9C9WB	988,218	1302	76	203
EP2FB	713,506	1056	75	173

Japan
Club Stations

JA3YBF	935,424	1294	93	159
JA9YBA	642,250	932	85	165
JA1YFL	492,480	780	84	156
JA1YLC	34,704	170	29	43
JA8YDL	26,523	148	25	38
JA7YAA	21,798	122	29	34
JA6YCL	13,266	73	30	37
JA1YKA	5,440	62	16	16

Singapore

9V1QE	1,015,625	1544	106	219

U.S.S.R.

Club Stations

Armenia

UK6GAA	2,976	40	12	19

Asiatic

UK9ABA	3,377,307	2089	145	434
UK9CAM	131,967	494	33	86
UK9FAA	26,220	121	30	46
UK9MKM	8,340	171	10	20
UK0CAA	10,868	235	17	21
UK0ZAD	2,574	112	9	9

Turkoman

UK8HAA	163,244	419	44	104

EUROPE

Austria

OE7UU/4	550,718	850	86	197

Belgium

ON5GA/F	528,878	873	82	177

Bulgaria

LZ1KAA	656,026	1106	93	236

Denmark

OZ7RD	57,125	335	31	62

England

G3WYK	2,150,685	1969	118	327
G3SSO	1,976,469	1904	110	282
G3KMI	612,864	1008	78	174
G3FVA	578,248	1110	62	162
G3YXR	532,656	815	81	193
G3CXX	486,920	915	84	196
G3ZBI	117,040	454	46	106

Finland

OH8OS	543,548	996	53	178
OH7AA	56,980	283	44	104

France

F6KAW	1,308,716	1712	93	228
F0ZZ	1,107,742	1614	78	191
F5KS	264,383	587	67	144

Germany

DL0JRA	1,168,504	1122	114	298
DL8CM	1,139,712	1362	100	218
DL0UE	1,092,385	1415	88	207
DL0RCA	1,004,276	1118	103	261
DL0AAA	749,800	971	96	230
DL8DC	675,136	979	71	176
DL0GO	672,752	946	90	214
DM2ATD	1,188,620	1359	115	279
DM4PL	837,720	1061	106	252

Hungary
Club Stations

HA5KDQ	216,629	1251	84	189
HA2KRB	183,360	572	63	128
HA9KOB	106,394	427	57	112
HA4KYH	66,430	387	42	88
HA6KNB	50,828	321	36	95
HA9KOL	50,374	433	24	65
HA8KUC	24,764	263	22	60
HA7KPO	20,252	303	13	48

Norway

LA1K	572,075	1311	64	181
LA1UH	516,890	986	73	181
LA2S	89,125	453	44	111
LA2T	51,888	300	39	95

Poland

SP5PWK	32,256	280	24	72

Portugal

CT1ZE	1,107,964	1551	82	204

Sweden

SM5AZU	194,588	432	68	166
SM3BNA/2	127,448	556	52	127

Wales

GW3VBX	81,396	452	34	99

Yugoslavia

YT2BHI	295,988	717	65	152
YU1AHI	236,985	606	71	188

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Club Stations

Estonia

UK2RAA	351,714	836	63	156
UK2RAV	103,320	471	42	98
UK2RAJ	21,567	252	19	60

European

UK6LAZ	1,164,548	1377	111	307
UK3ABO	1,009,470	1396	105	240
UK3R	679,150	1124	89	200
UK3VAA	231,476	662	64	132
UK4FAD	163,280	634	39	118
UK3YAB	79,255	423	42	89

Karelo-Finnish

UK1NAD	41,552	374	39	59

Latvia

UK2GDZ	63,756	304	32	45

Lithuania

UK2BBB	1,373,062	1635	109	248
UK2PAF	1,344,786	1452	111	271
UP2PA	494,422	942	81	188
UK2BAV	35,575	341	25	70

Ukraine

UK5VAE	90,932	566	39	88
UK5VAA	29,800	230	71	74
UK5ZAA	14,674	207	14	44

White Russia

UK2WAF	3,920	140	7	21

OCEANIA

Australia

VK2AHM	164,322	369	53	100

Guam

KG6AAY	1,456,569	2247	80	139

Hawaii

KH6SP	2,088,870	2424	100	194

Lord Howe Island

AX2APX/LH	640,156	1038	85	134

SOUTH AMERICA

Galapago Islands

HC8AA	2,679,100	3164	97	195

Netherlands Antilles

PJ9AF	4,536,780	4598	102	230
PJ1AA	4,067,352	3382	112	296

Uruguay

CW8CZ	1,221,450	2778	33	117

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W4BVV	2,914,704	1945	136	383
W3GM	2,703,909	1832	136	397
W6ISA	2,040,897	1701	137	314
K8HLR	2,018,484	1455	132	362
K4CG	1,654,554	1283	120	353
W3SS	806,139	727	107	302
W3MWC	776,135	728	112	285
WA3ATX	677,079	717	105	246
W8NGO	653,140	678	102	253
WA3ATP	444,500	467	98	252
K3HTZ	209,256	334	80	148
K2GXT	30,210	112	42	72

AFRICA

9E3USA	2,330,110	2071	102	287

ASIA

4Z4HF	5,683,200	4091	121	359
KA2US	261,166	670	57	77

EUROPE

OH5SM	6,408,171	4146	160	533
DK0WA	5,809,280	4004	147	493
DL0PG	3,311,568	2719	137	385
DL0WW	3,147,984	2595	122	382
OH1AA	2,280,552	2060	130	371
OHIVR	1,396,500	1645	129	346
UK2PAD	257,607	781	60	143
HA0KDA	142,968	584	48	136
YT2CTF	139,370	509	49	132
OH3NY	116,432	496	48	126

OCEANIA

W7UXP/KH6	2,424,552	3312	97	150
KH6EOQ	1,861,200	2759	94	141

SOUTH AMERICA

5J3CC	3,035,704	2921	140	255

Our thanks to the following stations who submitted their logs for checking purposes. AX9GG, CR4BS, CR6II, CR7LE, DJ2IB, DJ0PN, DJ0TA, DM3XHF, DM53021, EI2CB, EL2BK, F6AYH, FG7TC, FO8CS, FP8AP, FR7AG, GC2FZC, HA3YGC, IS1LIO, JA0BH, JY1B, K1DWQ/5, K2DT, KG4CS, KV4CS, KV4AA, KX6DC, LA3CH, LA3RC, LA7JH, LU6AEC, M1I, MP4BBW, MP4TCJ, OH2RD, OH6AA, OH7PB, PA0PRF, PY2CDR, RA3DBQ, SM2COR, SM3CJR, SM4APZ, SM7CSN, SP9DH, SV1AE, SV0WB, SV0WU, UA3BB, UA3FF, UA6PAA, UA6RB, UB5RR, UC2BF, UC2DZ, UK3SAB, UK3TAA, UK3VAJ, UK6LKA, UV3DN, UW6AO, VP2LO, VP2MK, VP8LK, VR2EQ/M, W1GYE, W1PCD, W2BJ, W2GT, W2WZ, W5SU, W6RQZ, W8FTQ, WA3JES/8, YS1RFF, ZD9BO, ZE3JJ, ZK1CD, 3V8AH, 4U1ITU, 5R8AS, 5Z4LW, 6W8AL, 8P6AH, 9H1BZ, 9K2AM, 9X5AA, 9Y4VT.

Station Operators

Multi-operator, Single Transmitter

AX2APX/LH: AX2APX, AX2BKM, W6CR. **CR6GA** & CR6LX, CR6XX. **CT1ZE** & CT1WB. **CW8CZ** & CX7BY, CX8BBH. **DL8CM** & DL8CH. **DL8DC** & DJ2XP, DK3II DL8AM. **DL0AAA:** DL3BK, DL3OH, DL6KB, DJ4XG, DK4ST. **DL0GO:** DJ8CK, DJ8CL, DJ8UL, DL2UN. **DL0JRA:** DL7HN, DL7MH, DL7OD, DL7ON, DL7OR. **DL0RCA:** DJ1GZ, DJ1IP, DJ2TK, DJ4EI, DJ6AP, DL2QB. **DL0UE:** DJ4GO, DJ0ND, DK2SS, DL3LU, DL8RL, DL8RM, DL9OC. **DM2ATD** & DM2DTO. **DM4PL:** DM2EDL, DM3ZOL, DM4SPL, DM5YHL. **EP2FB** & EP2YL. **F5KS:** 2 oprs. **F6KAW:** F5QE, F6AGM, F6AGN, F6AOI, F6AOJ, F6AOM, F6AUD, F8QB. **F0ZZ:** F2QQ, F5HN, F5ZK, F6AZP.**FB8XX:** F2JD, F6APG. **G3CXX:** G3XIK, G3YAC, G3YRU, G3YXN, G8DRJ, GI3UKS. **G3FVA:** G3FNM, G3VIW, G3WFT, G3SMM, G3YKJ, G3ZKO, G8DMJ, G8DKE, G8DNQ. **G3KMI:** G3TDL, G3VQN, G3WIE, G3WRR, G3WXC, G3XJM, G3YSI, G8BQA, G8CHM, G8COK, G8DPQ, GC3XZC. **G3PAC/W9** & K9HMY, WA9EJD. **G3SSO:** G2AGX, G2HDU, G3FXA, G3IFB, G3PEO, G3SSN, G8KG. **G3WYX** & G3HTA, G3RUV, G3RUX, G3TJW. **G3YXR:** G2DSY, G3MDR, G3WSL, G3ZQC. **G3ZBI** & G3ALA, G3LCV, G3YTX, G3ZLD, G3ZOW, G8DKV, G8DWV, G8DYK. **GW3VBX** & G3YFL, G3ZDQ. **HA5KDQ:** HA5DE, HA5EG, HA5FN, HA5HO. **HC8AA:** HC1RF, HC1SG. **HH9DL** & W6DQX, W6EJJ, W6WLH. **JA3YBF:** JA2JBU, JA3FGJ, JA3KGF, JA3LCR, JA3NAQ, JA3OLO, JA4FTD, JA5BNN, JA8EST, JA0CDC. **JA9YBA:** JA3GFQ, JA9BEX, JA9BLF, JA9BVW, JA9EXF, JA9FAN, JA9FFN, JA9FHK. **K2BK** & WB2BXL, WB2ZPW. **K2OQJ:** WA2DMF, WA2FVH, WA2JDD. **K2UTQ/2** & K2BQO, K2UYC, WB2SIH. **K3JYZ** & WA3JXJ. **K4CEF** & K4DBZ. **K5FIQ:** K4FTY, WA5QZG, WA5ZUJ, WA6IYK, WB6HLL. **K6AN** & K6AUC. **K6CQF/6** & VE3DXV. **K8UDJ** & K7NHV, K8BGZ, K8MFO. **K9CUY** & W9EI, WA9RQY. **K9PPJ** & K9QFZ, K9YVT, WA9UFV. **KG6AAY:** KH6GGZ, WA5KAK, WA9LAZ, WA0JYD, WB4CMP. **KH6SP:** K5LTH, K0QZP, W0QBW. **KL7AIZ:** K3OAR, K7ABX, W4HTK, W5GTK, W8AKS, WA5FRL, WB6LQZ, WB8BYT, WB9AIU. **KP4DCR** & F5ZW. **KZ5NG:** KZ5AQ, KZ5KD, KZ5KN, KZ5NW, WB6NGC. **LA1K:** LA2KM, LA2QK, LA6VM, LA6WN, LA7XK, LA9DL, LA0AG. **LA1UH** & LA1XM, LA9NN. **LA2S:** LA2PO, LA4KO, LA8ZL, LA9GL. **LA2T:** LA2TO, LA3PK, LA3VK, LA4ON, LA8HK, LA9AL. **LZ1KAA:** Club. **OE7UU/4** & OE4SZW. **ON5GA/F** & ON4WA, ON8AG, ON8US, ON8XG. **PJ1AA:** PA0LOU, PJ2ARI, PJ2CA, PJ2CH, PJ2CL, PJ2CR, PJ2CU, PJ2HT, PJ2PS, PJ2RB, PJ2TR, PJ2VD, PJ9VR. **PJ9AF:** W1FJJ, W3KMV. **SM3BNA/2** & SM2EKM. **SM5AZU** & SM0ATN, SM0MC. **SP5PWK:** SP5DZJ, SP8BUH. **UK2RAA:** UR2CW, UR2DW. **UK2RAV:** UR2EG, UR2MO. **UR2RAJ:** UR2-083700, UR2-083701. **UK3R:** UA3FG, UA3HK, UV3FR. **UK2PAF:** UP2CY, UP2NK, UP2OX, UP2PAJ, UP2PAO. **UK9ABA:** UA9AN, UA9BB, UA9BE, UW9AF, UA0BP, UA9-16525. **VE1ACU** & VE1ASJ. **VE2UN/2** & VE1JN, VE2DCW, WA3HRV. **VE3ENM** & VE3ABN. **VE6ARD** & VE6GS, VE6AAD. **VE6LB/6** & VE6AAD, VE6GS. **VE7AZT/W7** & VE7ZZ. **VK2AHM** & VK5NO. **VP1WMU:** K5TTA, W5IOU, W5WMU, WN5AAA. **VP2EE** & PJ7JC, K9RHN, W9IGW, W9ZTD. **VP2VP** & VE3ACD, VE3GMT, VP2VI. **VU2BEO** & VU2OMR. **W1MX:** WA8OCG, WA8WNU. **WA1LPJ** & WA1IZS. WB2SQN & K2KUR, W2IWC, WA2HIN. **W3WJD** & W3PSM. **WA3JZR:** K3WPG, W3DLN,

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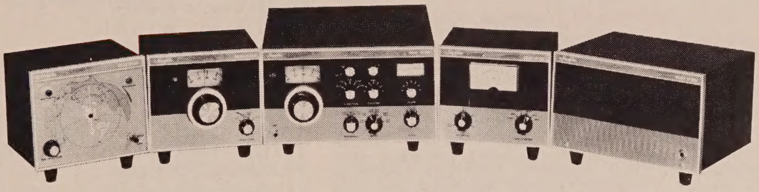
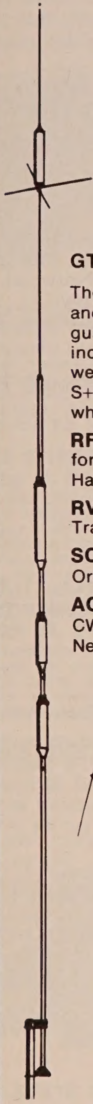




GT-550A Transceiver Order No. 855 Ham Net $495.00

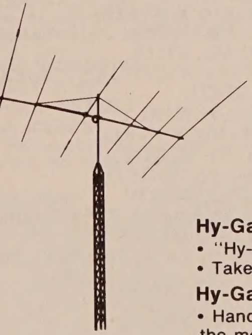
The GT-550A is the best transceiver on the market for the money. Bar none. Costs just $495.00 and delivers 550 watts of power. Operating either fixed station or mobile, this transceiver is guaranteed to have a top frequency stability after warm-up. We're so proud of the stability we include a graph with each GT-550A showing the purchaser how stable his radio was when it went through final check. 550 watts SSB; 360 watts CW; sensitivity better than .5 uv for 10db S+N/N; stable—45db carrier suppression; 25 KHz calibrator and vox option; no frequency jump when you switch sidebands.

RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

RV550A is a solid state VFO. Function switch selects the remote unit to control Receive-Transceive-Transmit frequency independently. Order No. 856 Ham Net $95.00

SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95



Hy-Gain's *Super Thunderbird* TH6DXX

• "Hy-Q" Traps • Up to 9.5db forward gain • 25db front-to-back ratio • SWR less than 1.5:1 on all bands • Takes maximum legal power • 24-foot boom. Order No. 389 Ham Net $179.95

Hy-Gain's 18 AVT/WB

• Wide band performance, 80 through 10 meters • Three Hy-Q traps • Top loading coil • True 1/4 wave resonance on all bands • SWR of 2:1 or less at band edges. Order No. 386 Ham Net $59.95

Hy-Gain's Thunderbird TH3Mk3 (not shown)

• "Hy-Q" traps • Up to 8db forward gain • 25 front-to-back ratio • Takes maximum legal power. Order No. 388 Ham Net $144.95

Hy-Gain's 400 Rotator/Indicator

• Handles large beams and stacked arrays with ease—up to 10 times the mechanical and braking capability of any rotator on the market. Order No. 400 Ham Net $189.95

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W3DRY, W3OEP, W3TOB, WA3IKV. **W4ATC:** WA2GBC, WB4IOJ, WB4JYB. **W4FDA** & WB4EYX, WB4IAE. **W4JD** & WA4HHW. **W4QBK** & K4THA, W4FWG, W4LCP, W4USQ. **W4RSS:** K4BIY, K4CRK, K4DOQ, K4UGY, WA4IQS, WA4NOF, WB4GXE, WB4KUF. **WA4UFW** & WA2HHO, WB4POB. **WB4DQM:** WA4CXN, WB4ISI, WB4NHO. **W6MAV** & WA6IQM. **W6OL** & WB6KIG. **WA6GLD** & WA6EPQ. **WB6CQY** & W6TWI. **WB6HDH** & WB6RGR, WB6RIU. **WB6SMG** & WA6BVY. **WB6TSX:** WB4IJH, WA0YFX. **WA7NOQ** & WA7KTD. **W8BVF** & K8TVO. **W8CUL:** K3SIW, K3ZAP, WA8YWK, WB8IAY. **W8CFG** & W8IML, W8OZA, W8ZCK, WB8HDR. **W8SH:** WA3FWT, WA3GBU, WB4JEZ, WA8SM, WA8TBQ, WB8DMN. **WA8ZCO** & WA8TOB. **W9YB:** K9YWJ, WA9YWZ, WB2RKK, WB9CLT. **W0GGC** & W0LJF, WA0QLN, WA0TNU, WN0AMJ. **W0HP** & K0WWX, W0PAN. **W0MYN** & WB0CMM. **WA0QIT:** 2 oprs. **WA0TJJ** & K0PMZ, WA0EMS, WB0CPZ. **YU1AHI:** YU1NZV, YU1NZW, YU1NVM, YU1NRO, YU1NM. **9C9WB:** EP2WB & Arno. **9V1QE** & K2IXP.

Station Operators
Multi-operator, Multi Transmitter

DK0WA: DK1FW, DK2BG, DK2BI, DJ1ER, DJ2BW, DJ2HH, DJ4PX, DL1CF, DL9OH, VS6AA, VS6DD. **DL0PG:** DK1HV, DK1QV, DK3BJ, DK3HV, DJ1FC, DJ9TQ, DL6WE. **DL0WW:** DC6CK, DC6FF, DJ3GR, DJ3YV, DJ4OQ, DJ4XN, DJ5JI, DJ6DU, DJ6NT, DJ9CE, DJ9VS, DL1OP, DL2LW, DL3ZA, DL6NK. **HA0KDA:** Club. **K2GXT:** WA2ADQ, WA2DKV, WA2FDA, WA2HUK, WA2WVG, WA3KDU, WB2PNN, WB2ZOW. **K3HTZ** & K3LKN, VE3BAW, WA3JIO, WA3LNM, WA3NIE. **K4CG:** K3WUW, K4CFB, K4PQL, W3JPT, WA4LKG, WA0IYZ, WB4KJR. **K8HLR** & W8ROF, WA8LYF, WA8OBG, WA8PSD, WA8TPV, WA8VMQ, WB2OEU, WB8ALP, Dave. **KA2US:** KA2AD, KA2EN, KA2NA, KA2QW, KA2SB, KA2SF. **KH6EOQ:** KH6GRN, KH6HHO, KH6HIF, W5CVC, WA8KPE, WB4QXD. **OH1AA:** OH1NH, OH1NK, OH1RG, OH1SS, OH1SY, OH1UZ, OH1YW. **OH1VR** & OH1RH, OH1VR, OH3TT, OH3UN, OH3WW, OH3YI, OH3XZ. **OH3NY** & OH2JG. **OH5SM** & OH2BCP, OH2BH, OH2BO, OH2SB, OH2WI, OH3QA, OH5NQ, OH5NW, OH5SE, OH5TS, OH5UG, OH5VY, OH6RM, OH6SM. **UK2PAD:** UP2BAA, UP2PAQ, UP2PAV, UP2QA, UP2SA. **VP9DX:** K4SHB, VP9BY, W2DXL, W3NNK, W4BRB, WB4OUH. **W3AU** & K3EST, W3AZD, W3IN, W3ZKN, W9SZR, WA3GVP, WA3IAQ, WA3LVX. **W3GM** & K3HTZ, K4WUY, W3JSX, W3LTV, W3NOH, WA3DSZ, WA3LNM. **W3MWC** & K3JLK, WA3JLT. **W3SS** & W3GRS, W3YCI, WA3LRO. **W4BVV** & K3NPV, K9OPF. **W6ISA:** K6PUR, K6SDR, K6VZA, W5CWQ, W6ITY, WA6CZR, WB6CYU, WB6LFR, WB6LFS, WB6LNW, WB6OLR, WB6ZUH. **W6VSS** & K2RBT, K6EVR, K6RU, K6SEN, W6UED, WA2WMT, WA6OHJ, WB6FVJ. **W7RM** & K7CBR, K7HTZ, K7JCA, K7UWT, K7VPF, W5QQQ, W7EXM, W7YGN. **W7UXP/KH6** & KH6HGP, WB2OIF. **W8NGO** & K8EHD, W8CLR, W8ONA, W8SRK. **WA3ATP** & W3GHD. **WA3ATX** & 3 Ops. **YT2CTF:** YT2RDU, YT2RHF, YT2RIL, YT2RIZ. **4Z4HF:** 4X4AE, 4X4FV, 4X4NJ, 4X4RW, 4Z4AG, 4Z4AI, 4Z4CD, 4Z4GV, 4Z4IX, 4Z4JT. **9E3USA:** Club.

DX *[from page 66]*

WB4ORP, 710 Minerva Drive, Murfreesboro, Tenn. 37130.
CR4BC—Via K4DSN.
CR7GJ—To W3HNK
CR9AK—c/o CT1BH.
CT1BT—Via W3HNK.
CT1ZW—To W3HNK.
DJIUS/DJUSA—Via WA7LMZ, Rt. 1, Box 299, Silverdale, Wash. 98383.
DU1FH (For major contests only)—c/o WA8TDY.
EA6AR—Via DL7FT.
EI2MC—To W6MJG, 653-42nd., San Mateo, Ca. 94403.
EI2VDQ—c/o W6MJG.
EI2VDX—Via K6TWT.
EL2CH—To American Embassy (AID), APO New York, N.Y. 09155.
ET3USA—c/o VE3IG.
FM7AA (Effective April 1, 1971) – Via WA8TDY.
FM7WN—To K2KGB.
FR7ZU—c/o F9MS.
FR7ZU/T—Via F9MS.
HM1EJ—To W3HNK.
HP1XOD—c/o K4OD, 9304 Hamilton Drive, Fairfax, Va. 22030.
HS3AEP—Via WB4QKE.
HT4CI—To WB9BUV.
HU2CEN—c/o WA8TDY.
HU0A—Via WA8TDY.
JD1ABO—To JA1BA.
JD1YAA—c/o JA1WU.
JW5NW—Via LA7RB.
KC6RK—To WA5BON.
KW6GA—c/o WA6AHF.
KW6HA—Via Gary Davey, 349 Sanford St., Leucadia, Ca. 94024.
MP4TDM—To K1DRN.
OA4DX—c/o K4OD.
OD5CS—Via W3HNK.
PJ6AA—To KV4AM.
PJ7JC—c/o VE3EUU.
PJ9BB—Via W2VIA.
TA3AC—To LA3UF.
TA6JB—c/o DJ9ZB.
TJ1BA—Via 4X4RH.
TR8MR—To VE2DCY.
TU2AZ—c/o DL7FT.
UH8, UI8, UJ8, or UL7—Send cards with s.a.s.e. to W3HNK, P.O. Box 14, Norwood, Pa. 19074. Allow 10 weeks for reply.
VK4 Bureau—Box 638, G.P.O., Brisbane, 4001, Queensland, Australia.
VP4AAA—Via W4DQS.
VP2AGA—To G3JUL, 56 Marlborough Road, Ashford, Middlesex, England.
VQ8CN—c/o K2OTC.
VQ9JA—Via WA6AHF.
VQ9SW—To JA0CUV.
VR5DK—c/o WA6QWW.
VS6DO—Via W2GHK.
VS9MB—To G3KDB.
VS9MM—c/o G3LQP.
VS9MT—Via G3LQP.
VU7US—To P.O. Box 534, New Delhi, India.
VU9KV—c/o W6KNH, 42 Donald Drive, Orinda, Ca. 94563.
XW8DK—Via WA6NFC.
YB0AAN—To K7DVK.
ZD8GA—c/o WA8AHF.
ZF1BL—Via W4BL, 3915 Shendoah Ave., St. Louis, Mo. 63110.
ZF1WF—To W4CDZ, Rt. 2, Box 353, Lewisville, N.C. 27023.
ZK1AJ—c/o W3RLY.
ZK1BM—Via W7VRO.
ZM7AG—To K3RLY.
ZS1MH—c/o WA1LDA.
ZS2MI—Via ZS6LW.
ZS3KC—To K4TXJ, 5504 Datura Lane, Louisville, Ky. 40258.
4M5BPG—c/o YV5BPG, P.O. Box 2253, Caracas 101, Venezuela.
5R8BF—Via W2CTN.
5VZWT—To W4SPX.
5Z4LW—c/o K8UDJ.
7Q7AA—Via W4CDZ.
8P6DR—To G3JUL.
9L1RP—c/o GW3AX.
9Q5HG—Via DJ4PS.
9X5AA—To W1YRC.
9X5CC—c/o WA5UHR.
9X5WJ—Via W1MIJ.
9Y4VV—To WA7PQE.

73, John, K4IIF

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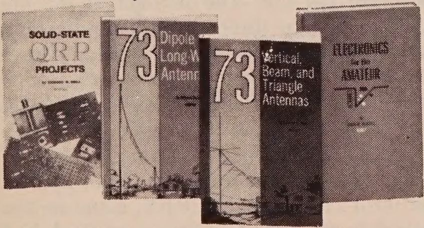
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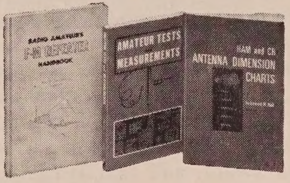
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Garden Patch [*from page 31*]

Now, switch to TRANSMIT. Your rig should now be in transmit. Observe the output signal on a Monitorscope or similar modulation monitoring device to be sure there is no stray noise on your signal such as 60 c.p.s. hum or r.f. feedback. Then, speak distinctly into the telephone mouthpiece and adjust for normal modulation using the rig's MIC GAIN control.

Remember to keep the output level low and to make sure your transmitted signal remains clean. I'm cure you'll enjoy helping non-hams enjoy the communications capabilities of amateur radio, as well as making a lot of people very happy. ■

Phone Results [*from page 37*]

elegible for the Canadian, Carib./C.A. and African awards.

Since information on some of the logs is rather meager, it is sometimes rather difficult to reach a decision. I hope we have not made any errors.

It seems to me that we did not have as many YL's in this year's affair as we have had in the past. However it was good to see that Cristina, EA8GZ was the winner of the African award, and that Irmgard, YV1YC was the all band winner for Venezuela. And of course that Carola and her crew at OH5-SM once again are the World Multi-Multi Champs. The rest of you gals that I missed, please forgive me.

That's about it for this one. We added a few more workers on this year's crew and we sure needed them, never could keep this "Numero Uno" Contest going without their help. The Committee, Fred Capossela, W2-IWC; Bob Entwistle, W1MDO; Garry Firtick, W1EBC; Ralph Nicholas, W1CNU; Andy Malashuk, W1GYE; Gene Walsh, K2-KUR and Bernie Welch, W8IMZ. Even Joan out at *CQ* had a hand in it, you can address all your complaints to her.

73 for this one, Frank, W1WY

Ultimate Alarm II [*from page 57*]

may be used alone if the car is prone to being stolen and a neat little transmitter hunt initiated to recover the vehicle. Microphones may be used in place of the tone module, the clappers can be replaced with mercury switches, and bells or air horns substituted for the noise making devices. (However, a siren is always handy when you want to get somewhere fast—and you can tell the officer that your alarm went off by accident when you are caught!)

A sign in the window warning that you have an alarm is sometimes helpful, but the authors experience has shown that most of the time such signs don't work. If the thief wants to get in, he will, if only to see whether the sign was for real. To lock the car is further useless for they will break a window and open the car from the inside. The author has reached the point where he doesn't even lock the car anymore—just the alarm. It goes off without fail and a friendlier relationship now exists between the insurance company and the insured as well as lower insurance rates. One early 3 month period showed four $30 vent window claims. It was after this the doors were left unlocked.

The systems have been in operation for 6 years and has proven to be a perfect and dependable way to protect any automobile or its contents. The equipment it has saved in the past has more than paid for its cost. ■

Crisis At 600' [*from page 28*]

multitude. With the exception of four or five stations that knew Al personally, all of the rest of the repeater users just stood by as we "talked" Al home. Al and I both arrived home at about the same time, and after he went QRT, there was a brief flurry of activity with everyone congratulating everyone else on the success of the night and then the repeater went silent with many of the stations taking time to reflect on the unusual use of the repeater had been put to that evening.

It can't be pointed out strongly enough that if it hadn't been for the repeater and the coincidence of my being on the street with the walkie-talkie on, K1LTJ might have become a silent key that night. When all else failed it was amateur radio and only amateur radio that saved his life! The firemen at the fire said that another three or four minutes and with no help on the way Al wouldn't have been alive due to asphyxiation. And no one in the building was aware that he was even there! Amateur radio and especially WA2-SUR came through and saved another life.

After that, all was quiet for about half an hour until Jack Jones, K2RBY, came on the repeater to ask what had happened. Jack had been to a double feature at the movies (remember them?) and had missed all of the excitement. So I explained starting with "You see, I have this GE Voice Commander that receives quite well but won't transmit . . ." ■

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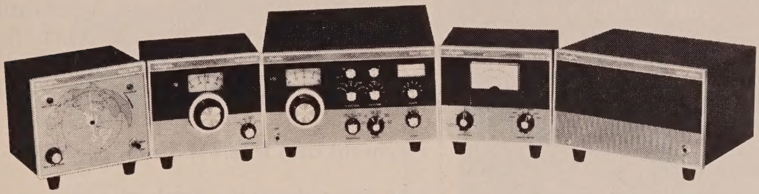

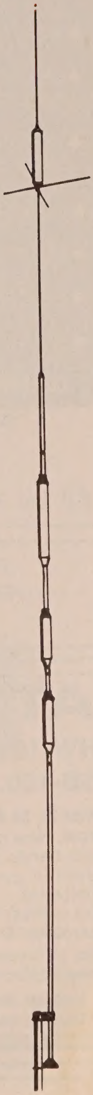

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RF550A contains high accuracy watt meter; calibrated in 400 and 4,000 watt scales; switch for forward or selected power; switch to select 5 antennas or dummy load. Order No. 857 Ham Net $75.00

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SC550A Speaker Console with headphone jack. AC400 power supply will mount inside. Order No. 858 Ham Net $29.95

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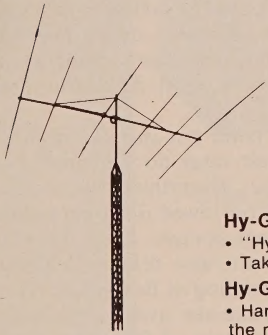

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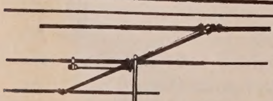

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CQ Reviews: [*from page 60*]

tower mounting plate in order to line up with any bearing at the end of the tower.

The Model 400 Roto-Brake Antenna Rotator is priced at $189.95, complete with mounting hardware and control box with four optional dial faces. Interconnecting cable is not supplied, but is available from the manufacturer. For more information, write to the manufacturer: Hy-Gain Electronics Corporation, P.O. Box 5407-FH, Lincoln, Nebraska 68505. *—W2AEF*

Payment and Interest [*from page 52*]

plan using the above firm's plan and an unpaid balance of $310.00, the apparent interest charge is still 10% per year or 15% for the 18 month period. However, the actual interest with the carrying charge of $46.50 would be approximately 19% per year or 27% for the 18 month period. Again going to the lower of the same repayment scale, $300.01, the actual interest would be approximately 19.6%. Again payment of the one cent would reduce the interest to the lower figure of 19%. Thus, payment of one cent could save many other cents. By the way, the above figures were calculated using a slide rule and are subject to the usual accuracy.

For those who doubt the formulas and the actual interest rates I wish to refer them to good college finance text.[1] The book footnoted is one that I used in college and gives a good description of how to derive interest rates. There are, however, many other good texts that will give a good description of interest rates.

Finally, let me point out that the quoted or apparent interest rates do not apply to only amateur gear. Everything purchased on credit or money borrowed is subject to the same concepts about interest. Also, there is no intent to discredit any firm or lending institution by the printing of this article. The sole intent is to make the average amateur aware of the true picture of financing. This picture is not available from all sources. The practices of most firms are quite legal and ethical. The interest rates are usually at a level to insure a profitable operation while allowing for bad debts. Unfortunately the

---

[1] *Financial Management (Second Edition);* Johnson, R. W.; Allyn and Bacon, Inc., Boston, Mass., 1965, page 274.

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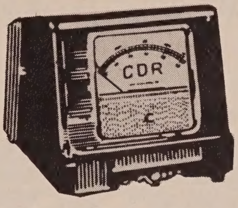

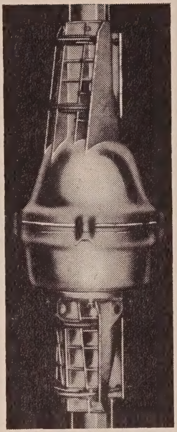

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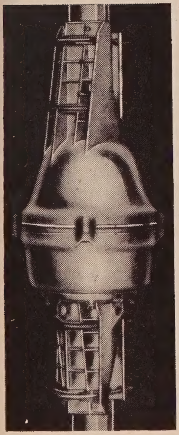

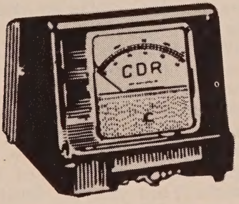

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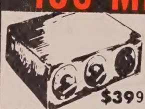

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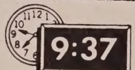

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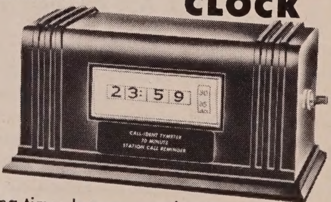

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practice of using apparent interest rates is misleading to those who have not undertaken some type of study of rates. Since interest charges are a significant part of the total cost of a piece of equipment, it will pay to shop around for the best rate and resultant lower total cost. Make sure and use the formula "T" when only apparent interest rates are given. Happy money saving. ■

Our Readers Say [*from page 8*]

way to prevent it is maintain some standards.

The 13 w.p.m. isn't really that difficult—if you make use of the Novice license and make those contacts in order to better your code speed, then 13 w.p.m. is there before you know it.

I have taught code to kids from age 10 to 17 and I read an article where a ham operator was teaching a 6th grade class code and theory for a Novice license. The reason these kids are able to make it is the simple fact they are interested and have a desire in their hobby.

If we lessen the standards now, then we eventually lessen the standards later and then the art itself. If this happens, then we stand to lose numbers 1, 3 and 6 of the Amateurs Code. If in anyway you might doubt this statement, then tune in on a CB frequency sometime—they *had* standards at one time and in essence they were relaxed.

The Generals and higher are more than willing to help a Novice or Tech increase his code speed or further his theory most anytime. (I know from experience and observation.) In fact, they have bent over backwards with a supply of parts and information for the Novice.

When you tag a letter from a General or higher as a person who has his and thinks anyone who doesn't can go hang—well you've missed the point in his letter.

At the time of this writing I've had my General for 8 days and I disagreed with lowering the code speed *before* the test and *after* the test.

Your interest in decreasing the code speed decreases my interest in your magazine. Your continued support for this ruling will definitely cause the termination of *CQ* magazine in my shack. Your interest must be somewhere else instead of for the amateur radio operator and *his interests.*

I like your magazine very much except for your obvious neglect of the amateurs true feelings about *his* hobby.

If you are really concerned about the amateur that you're serving—then show it by taking K4-EVY's (and more) suggestion and—take a poll!

Richard Milhous, WB6CYD
Nevada City, Ca.

Q & A [*from page 75*]

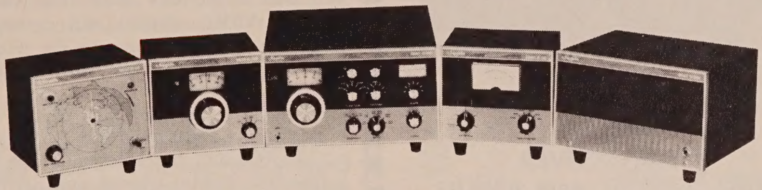
9—Don't use a linear for local QSO's or in other cases where not absolutely necessary. Help to keep the QRM down.

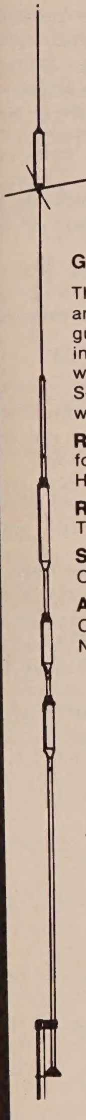
Manual Appeal

We are still in search of a manual or tech-

THE GALAXY 550A

MORE POWER, MORE FLEXIBILITY FOR THE Fixed Station...





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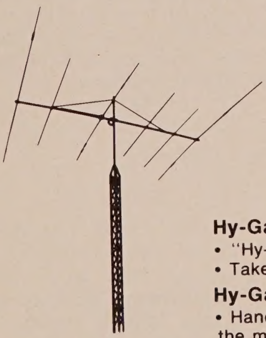

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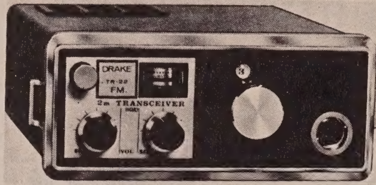

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73, Bill, W2AEF

Contest Calendar [*from page 80*]

Frequencies: C.W.–3550, 7050, 14050, 21050, 28050. s.s.b.–3990, 7290, 14290, 21390, 28590.

Awards: Certificates to the three top scorers in each of the four Delta states. (min. 50 QSO's) Each ARRL section and country. (min. 10 QSO's) Three Plaques to the Top Delta, outside Delta and Mobile scorers. There is also a Delta Achievement Award to all stations contacting 5 stations in each of the 4 states comprising the Delta Division.

Mobile and portables must file separate logs for each county change and each will be considered a separate entry.

Mailing deadline is Sept. 27th to: Malcolm P. Keown, W5RUB, 213 Moonmist, Vicksburg, Miss. 39180 (Note: Change from previously announced date.)

Editor's Notes

Having completed the report on the Phone Contest results, Anne and I packed our bags and took off on a short vacation to Italy.

A short stop-over at Amsterdam gave us an opportunity to have an "eyeball" with Lou, PA0LOU and John, ON4UN who finally got to see the Trophy he won back in 1969.

During our stay in Rome we visited Bro. Ed at HV3SJ which is a beautiful location just outside the Vatican. Later that night we returned with Al, I1AMU and Frank, I1ZV and had the added thrill of operating from a famous DX spot and talk to some of the boys stateside.

Now its back to the "salt mines" and to work on those c.w. logs the fellows had already started on while we were away.

73 for now, Frank, W1WY

F.M. [*from page 48*]

Finale

No construction project was included this month because of news and FCC intrepretations. This will be made up for next month with the universal control head and a neat little single-tone ("tone burst") encoder from the Benton Harbor, Michigan, area. I am still crying for photographs. How about it fellows. Don't forget to return your repeater directory card. If your group did not get one, let me know and I will forward one immediately. The postage on the card is paid by *CQ*, so only a few minutes with a pencil is required. Enough for now. Lets see everyone at Arlington, Texas, for the August meeting. ■

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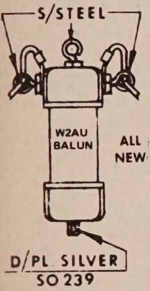

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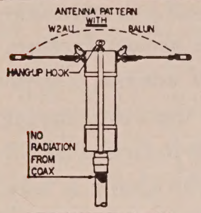

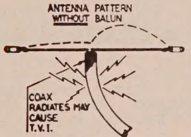

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SSB WANTED: SB-175 AM/CW/SSB 75W XMTR. Must be in good external and internal condx, and working on all modes. Hve only $40. WB6MDP, 6664 Lake Park Dr., Sacramento, Calif. 95831.

CLEGG 22'r $125; GONSET 6M Amp. 225W $75; APR-5A $75; TS-186D $49; GERTSCH FM4-A $149; APN-9 $15, Swap List S.A.S.E. W4API, Box 4095, Arlington, Virginia. 22204.

ASTATIC G-10D dynamic mic & grip to talk stand. Gonset GPP-1 phone patch. Both exc. condx. $25 each. WA2MQT, 22 Hargrove Dr., Stony Brook, N. Y. 11790.

WANTED: Desperate High School Ham Radio Club needs equipment badly. Will pay postage. Write to: WN8HQS, 811 Superior Ave., Gladstone, Mi. 49837.

HOOSIER ELECTRONICS Authorized dealers for Drake, Hy-Gain, Ten-Tec, Galaxy, Regency. All equipment new and fully guaranteed. Write today for our low quote. Hoosier Electronics, Dept. E, R.R. 25, Box 403, Terre Haute, Indiana. 47802.

Expense-free 2 or 4 weeks vacation in Mexico as my guest to ham. Please write XE1NE, Box 2807, Mexico City, Mexico.

ONE DAY SHIPMENT on Regency, Swan, and Drake 2-meter rig and crystals. Crystals $3.95 each, all popular frequencies and some "off-channels" in stock. Ed Juge Electronics, Inc., 3850 South Freeway, Fort Worth, Texas. 76110. Phone (817) 926-5221.

DXCC Certificate Holders are invited to attend the W9DXCC Annual Meeting September 18, 1971. Holiday Inn (Eden's Expressway), Chicago, Illinois. Registration and Program until 5:00 P.M. Dinner at 6:30 P.M. Advance PAID Registration $10.00, (includes dinner), Eligible for EARLY BIRD PRIZES! at door, $11.00. W9GIL, Chairman, 910 East Calumet Road, Milwaukee, Wis. 53217.

UNUSUAL RECEIVER VALUES: Collins 7551 $295; Collins 7553 $395; Hammarlund HQ170 $159; Hammarlund HQ170A/VHF $199; Hammarlund HQ180AC $299; National NC300 $119; Many more. Get complete listing. Stan Burghardt, W0IT, Box 73C, Watertown, S. Dak. 57201.

"1971 TESTS-ANSWERS" for FCC First and Second Class License. -plus- "Self-Study Ability Test", Proven! $9.95. Satisfaction guaranteed. Command, Box 26348-H, San Francisco, Ca. 94126.

FOR SALE: Robertshaw Tone Keyer (900-000-009) and Converter (900-000-010). New. $40 per set. Lewandowski, 1010 So. "J" St., Oxnard, California. 93030.

VHF SELLOUT: Ameco TX62 $89; Gonset GC105 $69; Johnson 6N2 Transmitter $69; Swan 250C/TV2B/117XC $549; Swan TV2B New $229. More items. Get Complete Listing. Stan Burghardt, W0IT, Box 73C, Watertown, S. D. 57201.

WANTED: Lampkin 105B Freq. Meter in good condition. Box NR 8352, Savannah, Ga. 31402.

SELL: HQ-170AC/VHF. Mint Condx. $225. K5-MHG/6, 419 Westbourne Dr., West Hollywood, California. 90048.

OUTSTANDING SSB DEALS: Drake T4XB/R4B/AC4/MS4 $795; Galaxy III and DC Supply $189; Heath HW32A $79; National NCX3/NCXA $219; National NCX5-MKII/NCXA $399; Many more. Get complete listing. Stan Burghardt, W0IT, Box 73C, Watertown, S. Dak. 57201.

SELL: Galaxy 5 Mark III transceiver, calibrator, excellent condition and low time, $300.00. W0-RJZ, Creston, Iowa. 50801.

NEW JERSEY QSO PARTY Will be August 21, and 22. See this month's issue for rules.

WARREN ARA 14TH HAMFEST — Still the friendliest. Sunday, Aug. 22, new site: Yankee Lake, on Ohio Rt. 7, five miles north I-80. Picnic, swimming, playground. Prizes, displays, giant free flea market. For details & map, send card: Hamfest, Box 809, Warren, Ohio. 44480.

NEW JERSEY QSO PARTY Will be August 21, and 22. See this month's issue for rules.

SELL: Realistic Allied Radio Shack DX-150 solid state communications receiver, general coverage, near-new condition with battery pack. Cost $127.95. Best offer. W0 RJZ, Creston, Iowa. 50801.

AWARDS CERTIFICATE HUNTERS — Join the International Certificate Hunters' Club with 245 DXCC countries represented. Write Int. AR Society, Box 385, Nonita, Ca. 92002 or WB6TUI. Send s.a.s.e.

SPEECH PROCESSOR, $20 Log or Linear, see HR Jan. '70. J. West, 315 Sunset Circle, Lookout Mountain, Tennessee. 37350.

FOR SALE: SBE34 - Mike. Mint condition. $210. WB6 MVK, 102 Northrop Pl., Santa Cruz, California. 95060.

BUY OR SWAP FOR SIGNAL—ONE, KWM2, DRAKE, HEATH, or YAESU. W0 BNF, Box 105, Kearney, Nebraska. 68847.

CINCY STAG HAMFEST: The 34th Annual STAG Hamfest will be held on September 26, 1971 at Stricker's Grove, Cincinnati, Ohio. Door prizes each hour, raffle, lots of food, flea market, model aircraft flying, and contests. Identify Mr. Hamfest and win prize. $5.00 cost covers everything. For further info, contact: John Bruning, W8 DSR, 6307 Fairhurst Avenue, Cincinnati, Ohio. 45213.

AUDIO FILTERS: Knock down that background noise. KOJO SSB, AM, and CW filters do the job. Write for free brochure and see how serious DX boys hear them. KOJO, Box 7774, 741 E. Highland Ave., Phoenix, Arizona. 85011.

WANTED: Construction Manual for a Johnson Viking II Transmitter. Original or Xerox copy. C. E. Krivich, 1901 Goold St., Racine, Wis. 53404.

HAM-A-RAMA Wood County Amateur Radio Club July 18, 1971 10:00 AM at Wood County Fairgrounds, Bowling Green, Ohio. 43402.

MANY THANKS to the many amateurs that came to my rescue for a manual on the AF No. 67. John J. Gaudio, K7 VIN, Phoenix, Az. 85032.

JOIN the International Amateur Radio Journalistic Society, ARS PRESS CARD. For further info, write K6 BX, P. S. The IARJS is IRS Tax Exempt organization.

NEW INTERNATIONAL Amateur Radio Society open to affiliation by any radio clubs or nets. Nonprofit, non-commercial. Already 108 affiliates and 199 club stations. Write K6 BX for info., P. O. Box 385, Bonita, Calif. 92002.

SBE-34 TRANSCEIVER with xtal cal., mic., & mobile mount, $250. Collins KWS-1, $525 crated f.o.b., $475 if you pick up. W4 MKT, Paul Robbins, Jr., 121 Motor Rd., Winston-Salem, N. C. 27105.

SELL or SWAP — SWAN 350 late model serial No. C—939684 with 117 CX power, electrovoice 719 mic like new. $360 firm. WILL TRADE for top quality receiver with CW filter. Also looking for Drake 2 Nt CW transmitter, linear. W2 ISN, F. Galla, 147-37 Roosevelt Ave., Flushing, N. Y. 11354.

WANTED: Good used Heath 1B-101 frequency counter in working condition. Box 8352, Savannah, Georgia. 31402.

HAMFEST: Indiana Radio Club Council's annual picnic Sunday, July 11th, LaPorte County Fairgrounds, LaPorte, Indiana. Large Flea Market with reserved locations available for large exhibitors and vendors on the Midway and Main Building. Mobile FM Clinic. Prizes. Tech Sessions. For flyer, write: Dave Osborn, K9 BPV, P. O. Box 272, LaPorte, Indiana. 46350.

RUBBER ADDRESS STAMPS, $2.00. Signature, $3.50. Free catalog. Jackson's, Box 443F, Franklin Park, Illinois. 60131.

HEATHKIT IM—25 FET input completely assembled in brand new condition, with new batteries. Asking $90.00. A. Greenberg, 821 Rutgers Road, Franklin Sq., N. Y. 11010.

REALISTIC TRANSMITTER BARGAINS: Johnson Valiants $89; Johnson Factory Wired Valiant with Johnson SSB Adaptor $189; Many more. Get complete Listing. Stan Burghardt, W0 IT Box 73C, Watertown, S. Dak. 57201.

WANTED: HA-410 Lafayette Transceiver in good Condition. State cash price. VE6 MO, H. V. Gilpin, Viking, Alberta, Can.

GERTSCH FM7/DM3 Frequency Modulation Meter, 560 FM Generator, all excellent, will sacrifice. Home Service Center, Carroll, Iowa. 51401. Ph. 712 792-9684.

WANT: Early receivers, especially Atwater-Kent & others with speaker as separate unit. Also want another ham to help rebuild early set. Julian Young, 11 Willow Court, Totowa, N. J. 07512.

ONE URM-250, .01-50 mhz, xtal calb. Sig. Gen., $250.00. ONE Boonton No. 202B FM-AM Sig. Gen. 54-216 mc $275.00. ONE HP-TS 418 c/u — AN/URM 49A. 400—1000 mc pulse Gen., $300. ONE HP-TS-403/u Pulse Gen. 1800—4000 mc $425. ONE TS-622 A/u Sig. Gen. (Pulse) 7000-11000 mc $625.00. ONE APR-1 Radio Receiver. Best offer. B. J. Williams, P. O. Box 7057, Norfolk, Va. 23509.

CREATE A QSL with a "Sampler Instruction Kit" 25 cents. Samco, manufacturer of (Xtra-Class) & regular printed QSLs. Write Samco, Box 203, Wynantskill, N. Y. 12198.

MANUALS: $6.50 each-- R-390/URR, CV-591A/URR, BC-348JNQ, LM-21, BC-639A, OS-8C/U; $7.50 each-- R-388/URR, UPM-45. Hundreds more. List 25 cents (coin). W3 IHD, 4905 Roanne Drive, Washington, D. C. 20021.

IMPROVE YOUR PERSONALITY! 110 Page Book- "Dynamic Thinking" shows How. Send $1.00. JOYCE'S CHOICES, 2908 Columbia Avenue, Lancaster, Penna. 17603.

REGENCY HR-2, $229, Hi-band or Low-band monitor $139. Hi/Lo-band $169. Large stock of crystals. WE SHIP THE DAY YOUR ORDER REACHES US! Ed Juge Electronics Inc., 3850 South Freeway, Fort Worth, Texas 76110. Phone (817) 926-5221.

FM Equipment; IC2F, new $255; Standard SR-C826M $279; Dumont Transistor powered mobile $45; GE 60w mobile $95; Mobile Linear Amplifier $95; Tone En/Decoders $25; Yaesu, Kenwood, etc. HIGLEY, 1196 Elberon Ave., Elberon, New Jersey. 07740.

QSLS. SECOND TO NONE. SAME DAY SERVICE. Samples 25 cents. Ray, K7 HLR, Box 331, Clearfield, Utah. 84015.

SWAN CYGNET 260 transceiver used less than 10 hours - best offer over $300.00; KW-2000 transceiver, s.s.b. and c.w. over 10-160 meters, with power supply, speaker, and mike - $310.00. KWM-2 excellent condx, never used mobile- $720.00, with AC supply and speaker, K4 IIF, P. O. Box 205, Winter Haven, Fla. 33880.

SELLING OUT WAREHOUSE FULL TELETYPE & Facsimile machines, parts & equipment. Loads of electronic equipment, no reasonable offers refused. No list or catalogue available. Saturdays, Sundays or Holidays by appt.—weekdays 10-4. 312-GR6-8200. C. B. Goodman & Co., 5826 S. Western Ave., Chicago, Illinois. 60636.

ACTION TRADER: The Action Trader can sell your equipment without emptying your wallet. Sell your Ham, CB, HI-FI & Misc electronic gear. Write for free issue or send $2.00 for eight issues. Action Trader, P. O. Box 27315, Col., Oh. 43227.

COLLINS: R-390A receiver, excellent $800, R-390A receiver fair $600, (needs tune up), R-388/51J3 rcvr $300 (fair-), Hickock scope RF preamp model 1820—perfect—$65, matching dual diversity converter with dual AFC for above receivers, $400. Prefer local inspection and sale. Weldon Drennan, Jr., 510 Iowa Ave., Beaumont, Texas. 77705.

REED RELAYS 3PST 12vDC Coil. Reeds easily removed from coil. R.F.E. 3/$1.00. Amphenol 57 series mated connectors. 50 contacts. Per Pair 50 cents. FREE CATALOG. R. W. Electronics, 4005 West Belmont, Chicago, Illinois. 60641.

SALE: SBE-33 excellent condition. New tubes. One owner. $300 or best offer. W6 NPS, Box 565, Mount Shasta, Calif. 96067.

SELL: 75A4 with three filters and manual. Excellent condition. $450. Also Thor 6 transceiver. Complete, like new. With manual. Norman Swayne, W3-AOL, 815 W. 15th St., Tyrone, Penna. 16686.

ELEXCO: We carry a complete line of Amateur Equipment. Hallicrafters, Galaxy, Hy-Gain, National, Varitronics, Regency, Ten-Tec, Kirk, Cushcraft, Hustler, Tristao, and many more. Before you buy or trade, write us for our low prices and high trades. Bankamericard, Master-Charge and financing. ELEXCO, Suite B, 608 Papworth, Metairie, La. 70005.

You all come to International Independent County Hunters Convention in Kansas City, July 2, 3, 4, 1971. SASE to WA0SHE for information. 6001 Blue Ridge Cut Off, Raytown, Missouri. 64133.

EXCITING LISTENING: Police — Fire — Emergency calls on your broadcast radio, $19.95 up. Also receivers, scanners, dual/band, crystals. Salch Company, Woodsboro, 3, Texas. 78393.

100 TWO COLOR GLOSSY QSL CARDS $3.25. W3LXY,118 Mill Creek Ave., Pottsville, Pa. 17901.

QSL PHOTO STAMPS: Glossy free samples. B & C ENTERPRISES, P. O. Box 49C, Luray, Va. 22835.

GREENE ... guaranteed water tight center insulator ... with or without BALUN ... a tough item to beat ... flier free ... Greene Insulator, Box 423, Wakefield, Rhode Island. 02880.

HEATHKITS wired 15% of cost. Price, reference on request. SASE. P. O. Box 6144, Linglestown, Penna. 17112.

QSL Manager. Will volunteer my services. W7HKI, D. G. Larry Larison, Traveler's Lodge, Edmonds, Washington. 98020.

NOVICES: Need help for general ticket? Complete recorded audio-visual Theory Instruction. Easy, no electronic background necessary. Write for free information. AMATEUR LICENSE, Box 6015, Norfolk, Virginia. 23508.

ELECTRIC PENCIL — WRITES, etches all metals. $3.00. Details free. C. W. Peterson, 2201 North 3rd St., Minneapolis, Minn. 55411.

FOR SALE: 2— 4-400 as new in sealed unopened cartons, $25.00 each. HG10 VFO $20; 2-833As, $7.50 each, 2-810's, $7.50 each. 3-4X250 HF Sockets, $4.00 each. J. Lee Best, Jr., W4KUV, 610 N. Madison Ave., Goldsboro, N. C. 27530.

FOR SALE: QST's 25 cents per copy plus shipping or trade for CQ's. Send your list or offer to: K1MBI, 21 Freestone Ave., Portland, Conn. 06480.

40-MTR QUAD. New, Kirk, in factory sealed carton. Will ship. $375 or SB-102 trade. Mosley 5 el, 46-ft boom CL-20, pick-up only, $175. K1VTM, (203) 388-0372.

SELL: Hammarlund HQ160 with Manual $125. (or best cash offer). Heath DX60B, excellent with manual, asking $50. Elenco SSB5 band Transmitter with built-in VFO & supply, Asking $50. John Fearon, 3384 Peachtree Rd., N. E., Suite 705, Atlanta, Ga. 30326. Home phone: 237-1261. W4WKP

SELL: Old QST's Jan "43", Feb "46", Oct and Dec "47". ALSO 1947 Allied Catalog. $1.00 ea., plusshipping. T. Coddington, WB6AWC, 7825 Scotts Valley Rd., Lakeport, Calif. 95453.

FOR SALE: Success Motivation Institute Personal Success Planner Course, $150.00 or swap for ham gear. W8IIT, 281 Jenny Lane, Dayton, Oh. 45459.

MAGAZINES FOR SALE: Send list of ham (only) issues needed, money (10 cents each) and postage costs to Lockheed Amateur Radio Club, 2814 Empire Avenue, Burbank, Calif. 91504. Your issues (and any refund due) will be sent promptly.

MOTOTOLA 41V crystals 146.94 and 146.34 new $9.00. ALSO AC supply, $20.00; Hy-Gain 2BDG forty and eighty antenna with 50' coax. $24.00. W5SYB, 5000 Hall, Amarillo, Texas. 79109.

UNUSED: Elapsed time meter (110V. 60 cy.) only $5.00 plus p.p., Collins Mechanical Filters types: F300-F5, F300-Z4, F500-B14 at $10.00 ea., some good 2C39A tubes at $2.50 each. Samkofsky, 201 Eastern Pkwy., Brooklyn, N. Y. 11238.

New International Amateur Radio Society formed. Not a Green Commercial. For details SASE to IARS, Inc., P. O. Box 385, Bonita, Ca. 92002. Clif Evans, K6BX, non-paid Gen. Mgr.

SELL: 2 meter FM, IC-2F-STD, $180.00, W4YNP, 612 Archove Ct., Norfolk, Va. 23502.

WANTED: For DXpedition this summer. TINY TIGER or other ultralight motor generator. Will Buy or Trade ham gear, test equip. W4ZUS, 5826 Sandstone Dr., Durham, N. C. 27707. (919) 544-3556.

HELP a Novice get started. I'll take any unwanted ham gear free. SASE for info. WN7QDQ, Rt. 5, Box 297, Olympia, Wa. 98501.

FOR SALE: G-28, $85; HA350, $85; HT46 SSB Xmtr, $200. J. F. Ferullo, W1HFF, 15 Spring Ave., Revere, Mass. 02151.

HAMMARLUND MC-35-S Capacitor 6-35 pf. $1.00. Radio Condenser Co. Dual 11-260 pf 1600vdc $1.50; 25" RG8A/U with S)-239 & PL-259A, .85— All postpaid. K. Maas, 256 Robert St., Burlington, Wisconsin. 53105.

SELL: New Mars Mobile 75-40 mtr. Xmtr., Pwr Supply, Xtals, Mike, $40.00. La Vern Smith, 3104 Catherwood Avenue, Indianapolis, Ind. 46226.

I WOULD LIKE SKEDS for 5 Band Was. CW only. Roger Pender, K5MHG/6, 419 Westbourne Dr., L. A., California. 90048.

AMECO code records, No. 104-33 and No. 106-33. Perfect condx, $6.00. P. O. Box 361, Mamaroneck, N. Y. 10543.

WANTED: Exciter with vfo to drive pr813's CW SSB without attenuation. J. Blaske, 413 S. Ocean Blvd., Pompano Beach, Fla. 33062.

SB-34 with mike and manual, $295.00, DX-40 like new, $55.00; SX-28 no speaker, $60; FOB, others postpaid U.S. from Larry Dodd, 917 Dreiling, Apt. C-8, Junction City, Kansas. 66441.

QSL's SECOND TO NONE. Same day service. Samples 25 cents. Ray, K7HLR, Box 331, Clearfield, Utah. 84015.

WANTED: Antenna Noise Bridge. WA4KCN, 4921 Edenshire, Memphis, Tennessee. 38117.

MULTI-ELMAC AF-67. Want to beg, borrow, or steal manual for it. WB6KKI, 217 Santa Mariana, La Puente, Calif. 91746.

LINEAR BUILDERS: Send for low-priced list of high power parts. Be delighted. R. D. Mace, 8600 Skyline Dr., Los Angeles, Calif. 90046.

WANTED: S-Meter for Collins R-388 (51J-3) Receiver. State price & condx. J. E. Gaudet, K1CLM, 61 Adele Ave., Haverhill, Mass. 01830.

FOR SALE: Gonset Aircraft Monitor Radio, Mod. 3156 AM. Bell & Howell Movie Camera 8 mm. Currin L. Skutt, W8FSZ, 119 N. Foster Ave., Lansing, Michigan. 48912.

WANTED: Modulation Transformer for DX100B, Heath MF6 only — Please — W1KGU, 294 Summer St., Brockton, Mass. 02402.

FOR SALE OR TRADE for good SSB rig: Pre-1925 Atwater Kent 33. FreedEismann FE-15 Battery radios with spkrs. J. DeMarco, P. O. Drawer 6085, Carmel, Calif. 93921.

FOR SALE: Heath SB301 rcvr. Assembled & aligned. Never used, $200.00. W1VKQ, 14 Bryant Rd., Nashua, N. H. 03060.

FOR SALE: Model "T" Simpson 2 meter transceiver (FM) (one month old) 4 sets of crystals, $200. K1BDN, 16 Wildwood Trail, East Greenwich, R. I. 02818.

SELL: Freq. Meters TS-174 $40; TS-175 with AC supplies. Johnson Courier, $120; Drake 6 & 2 mtr. converters, ac supply, calibrator, console $110. Thordarson 2300-0-2300 at .3 amp, $15. 3600-0-3600 at 1.7 amp$40. W0AIH,814 4th St S, Virginia, Minn. 55792.

FOR SALE: Pair RCA CW-5B, 960 Mc. crystal controlled receivers, rack mounting. P. L. Lemon, 3154 Stony Point Rd., Santa Rosa, Calif. 95401.

VERY CHEAP: Chokes, Resistors, Switches, Transformers, Sockets, Hardware, etc. All new. SASE for list. Coffield, 40 Mitchell Ave., East Northport, N. Y. 11731.

SELL: RA20 P.S. 12V-4A-220 V-200 MA-$5. RAX-3 Recvr 7-27 MC with print, needs paint, $15.00. BC906D Freq Mtr. 145-235 MC $10.00-. FOB J. J. Crowl, POB 74, Ingram, Tex. 78025.

SALE: G-28 10M Comm., $125; GPPI PH Patch, $30; DX40, $50; Heath 10'er, $50. WB9FHQ, B. Cook, RT 1, Box 132A, Warrenville, Il. 60555.

DRAKE 2B, 2BQ, 2AC calibrator, excellent, $190. HT-37 transmitter $165. HT-41 linear amplifier, $175. All for $500. All original owner with manual. Gerry, WB2FJX, (212) 641-4573.

FOR SALE: Instructograph in A-1 shape with Key, cans, tapes, $50 ppd. Wanted: Manual for Philco Mod. 7008 Visual Alignment Generator. Joey Leonard, WN4TMD, 810 Hawthorne Rd SW, Winston-Salem, N. C. 27103.

Wheatstone Keyboard Perforator— $50. Speaker for 75A4— $15. W2CVW, 13 Robert Circle, S. Amboy, N. J. 08879.

SELL: HD75-40 66 ft. MOR-GAIN ANT. PERFECT. $18. WA4KCN, 4921 Edenshire, Memphis, Tennessee. 38117.

WANTED: Old Crosley Mod. 51 & 52 battery radio receivers. Have several Model 50 to trade. W7KE, 1109 S. 2nd, Hamilton, Montana. 59840.

FOR SALE: Two (2) Western Union Naval Observatory clocks, $35.00 each, Goodman, 5826 S. Western Chicago, Illinois. 60636.

SSB: HT-46 Xmtr, $165; SX-146 Rcvr, $145; Both excellent condx. Phil Serafinas, 925 Coleridge Rd., Balto., Md. 21229.

SELL: 40 mtr. Quad; SB-102, AC; Eico 753; Drake B-Line, R. Nevers, 23 Sunrise Ave., Old Saybrook, Ct. 06475. (203-388-0372).

SPECTRUM ANALYZER 455KC-Variable Sweep width & rate 5" scope, complete, excellent, with schematics. R. Mendelson, 27 Somerset Pl., Murray Hill, N. J. 07974.

HI to 14.320 Gang, from Bill EX-KH6EOQ, 65-67-DL4CJ, Bill Christmas, HHC7 Corps (Signal), APO N. Y. 09107.

WANTED: Good rcvr (Drake, Heath, etc.) in non-working condx. to buy cheap. Also novice xmtr. Please write telling condx and your price. WN2-PWS, 2 Carteret Ct., Madison, N. J. 07940.

GOSPEL RECORD ALBUM by Chas. Vickers, Stereo. WA8FLE, original song, "If only you'd believe", $4.95 pp. F. Fellows, 2821 Honesdale Ct. Cinn., Ohio. 45239.

FOR SALE: Mod. S-95 Hallicrafter Rcvr. 152-173 MC FM. Mint condx. FOB. $28. H. Hastings, 13445 Hwy. 80 SP 42, El Cajon, Ca. 92021.

WANTED: Some experienced help on servicing NCX500. K9MKX, 19W167 21st Pl., Lombard, Illinois. 60148.

SELL: Galaxy Wattmeter RF550, $50. Johnson Viking Phone Patch, $15. Dow Key Relay, $10. WB2YRU, A. Povol, 3538 Centerview Ave., Wantagh, N. Y. 11793.

THE LOCKHEED HAM CLUB regularly conducts novice and general class licensing courses which are open to all LA-Area people. Write to 2814 Empire Ave., Burbank, Calif. 91504, for full particulars.

NEEDED: 200 or 500 cycle filter for Collins 75A4. L. Beyer, 10W. 35th St., Holland, Mi. 49423.

FOR SALE: Teletype perforator tape 11/16" wide, ten rolls per box, $4.00 ppd in U.S. BILL'S, P. O. Box 5864, Asheville, N. C. 28803.

CASH for bargain in 3 or 5 band transceiver. Quote details and price first letter. K5ENL, Ed Block, Rt. 4, Box 127, Grandview, Tx. 76050.

FOR SALE: R-390A $600.00 plus shipping. 25W. 30-50 Mhz FM. Mobile VRC-9, $110. WA5RFW 7215 Meadow Breeze Dr., San Antonio, Tex. 78227.

TS34A/AP OWNERS: Let me buy or borrow your schematic or Tech. Manual. M. Brame, Rt. 4, Logan, Ohio. 43138.

URGENTLY NEED Manual or borrow one to copy for Signal Generator TS-413A/U. F. E. Rice, RICE'S RADIO & ELECTRIC SERV., 309 E. Main, Glasgow, Kentucky. 42141.

GEIGER COUNTER, AN/PDR-10, good cond., reduced to $7.95 FOB Salem, W4JGO, 643 Diamond Rd., Salem, Va. 24153.

FOR SALE: Elmac AF-67 $30; PMR-7 $45. 6, 12 & 110 V P.S., $20 OR $90 FOR ALL. Excellent cond. with manuals. Shipped cod. T. Isaacson, 101 S. Lake Dr., Branson, Mo. 65616.

SALE: CQ's, QST's, any quantity from 1 to 100. Send your list for quotation. Erv Rasmussen. W6-YPM, 164 Lowell St., Redwood City, Ca. 94062.

WANTED: W8FYO Key Lever for Electronic Keyer. 2.1 KC Mechanical Filter for 75A4. K9WEH, 201 E. Marion, Prospect Hts., Ill. 60070.

THE STATE LINE AMATEUR RADIO CLUB of N. Y. & N. J. is looking to increase its membership. For info., call WA2FGF, (201) 768-4398.

RTTY INFORMATION for the Amateur interested in RTTY. F. DeMotte, P. O. B. 6047, Daytona Bch., Florida. 32022.

R-220/URR or similar Receiver wanted. Also— Want ARN-14C or similar VHF set. Sundheimer, W0NBZ, 13020 Lakeview Dr., Burnsville, Mn. 55378.

SWAP: Collins Hy-Gain TD-1 "Tape Dipole" ant for electron. Keyer, WA6GZZ, (916) 331-2185.

SELL: Matched Heath Station, SB Line, 101 Xcvr w/all acc., Linear, Keyer, Scope, Clock/SWR BR/ Patch, Pwr Sup/Spkr, Mike, 18AVQ Ant. Like New-Fact. Align. $750.00 firm or FM Port. Plus $. Arthur, 3809 Casanova, San Mateo, Ca. 94403.

TRADE OR SELL: 4 el. Gem Quad and 1971 Royal Red Ency. Britannica for 40M. Beam or Tower or make offer. K5MDX, 502 Colonial Cir., Jackson, Ms. 39211.

WANTED: Old battery-operated radios of the early 1920's. Need not be working condition. Also want old iron toys and lead casting molds. D. T. McKenzie, 1200 West Euclid, Indianola, Iowa. 50125.

SELL OR TRADE: CQ, 1950-70, $50. QST, 1924-70, $200. Complete, excell. condx, with library-type storage boxes. Trade toward SB-101, TR-4, R4/T-4X, eqpt must be in excell. shape. Al Brogdon, K3KMO, 2956 Hewitt Ave., Silver Spring, Maryland. 20906.

80 FOOT TOWER with guys, $125. I.C.S., Vacuum Variables, etc., SASE for list. W2VJN, RD Number 1, Box 659A, Princeton, N. J. 08540.

WANTED: Hewlett Packard 525A plug in units, & elements for Bird Model 43 wattmeter. W. Davis, K6KZT, 4434 Josie Ave., Lakewood, Calif. 90713.

WANTED: S/Line, Drake Line, Sell/Trade mint Signal-One. Don Payne, K4ID, Box 525, Springfield, Tenn. 37172. Nites (615) 384-5643.

SALE: Galaxy GT550, RV550 VFO, AC-400 P.S., SC-550 Matching Spkr., $450. WB2ZAP, 922 Southern Drive, Franklin Square, N. Y. 11010.

FOR SALE: Collins 136B2 Noise Blanker - never used $50. J. P. Ashcraft, 3008 Southwestern Blvd., Dallas, Texas. 75225.

FOR SALE: Johnson Viking 2 Transmitter, $50. W1MEG, Gordon Hopper, 75 Kendall Ave., Framingham, Mass. 01701.

FOR SALE: Drake 2NT Transmitter, never used. $120. HR10, $50. W8CUT, 1776 Walnut St., Coshocton, Ohio. 43812.

SELL OR SWAP: BC-348, ARC-5's, RCA WO-33, EICO 460W, Heath OP-1, S-76 EICO 232. T. Gosman, 143 Roxton Rd., Plainview, N. Y. 11803.

SALE: Elmac AF L7 (FM/AM) 65 W. (160 thru 10) Transmitter. $60; PMR-6A Rcvr, $55; P.S., $25; Eico 70W. Stereo Amplifier, $60; ATR Inverter 12VDC to 110VAC, $60. Nord Starfire Copy Machine, $40. RCA Sig Gen., 170 KC to 100 MC $25. E. Simmons, W3QAN, (215) 326-1123), 400 Highland Rd., Pottstown, Penna. 19464.

WANTED: Will buy Collins 30S1 Linear in good condition. J. P. Ashcraft, 3008 Southwestern Blvd., Dallas, Texas. 75225. Phone (214) 368-7389 nites.

WANT: GR-1211; HP-803A. Trade or sell H-P Sig Gen; Stoddart; Gertsch; Alfred; Menlo; GR; Bird, list SASE. W4API, Box 4095, Arlington, Va. 22204.

WANTED: HG-10B, VFO; HD-10 Keyer, 18AVQ, or good beam. Cheap. R. E. Lennon, WA7OPF—32817 —51 So., Auburn, Wash. 98002.

WANTED: Single Sideband Xmtr. K6STH, 239 K Street, Chula Vista, California. 92011.

SELL: Complete CIE Radio Technology Course. 3/4 unused. $150.00. K9SQV, R1, Pembine, Wisconsin. 54156.

ESTATE: Mint KWM-2 & 516F-2. $595 or best offer. Johnson Ranger, $60. W0MAI, Box 895, Greeley, Co. 80631.

WANT: Spreaders, spiders, hardware., etc. to build quad. SELL: Heath HM-15, HD-15. WA1JFG, 120 Oaktree Dr., N. Kingstown, R. I. 02852.

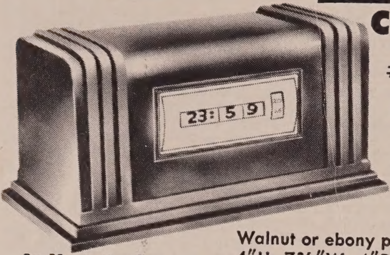
TRADE: One acre in N. M. Interested in Ham gear and Towers. W. M. Froembgen, W5VBQ, 1213 Bellamah Dr., Alamogordo, N. M. 88310.

WANTED: 100V or 200V with factory 160 meter coils, or factory coils separately. E. Erickson, W2-CVW, 13 Robert Cir. S. Amboy, N. J. 08879.

So. Calif. only, Sell 750 watt 4-400 amplifier & pwr supply described in Mar/Apr CQ for $75.00. W6-BLZ, 528 Colima St., La Jolla, Calif. 92037.

WANTED: Good, used Bug. Any Model. C. Breedenen, W4GYY, R-7 Schaad Rd., Knoxville, Tn. 37921.

AN/TRC-7 wanted. Also AN/PRC-21, 33, 34, 36, 40, others. WA1NYR, 303 Cross St., Winchester, Ma. 01890.



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WANTED: Collins 637T-2 Adjustable Dipole Antenna or HyGain 18TD Reel Tape. Portable Dipole. F. Young, 917 Hillcrest Dr., Vienna, Va. 22180. (703) 938-8805. WB4MPP.

SELL: SB101, external LMO. AC Power Supply, Speaker, $400. Clegg 99'r $45; Johnson Matchbox, $50. WA2KAB, Box 297, Shoreham, L. I., N. Y. 11786.

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WANTED: Electronic Test Gear. Counter, Sig Gen, Audio Osc, etc. Ferrigno, 23 Beech Hill, Peacedale, R. I. 02879.

SELL 2 Jennings Vac. Variables. Type U, 50-250 mmf 15KV. 1 new, $30. 1 used, $25. Geo. Nolan, 10 Hillside Avenue, Englewood, N. J. 07631.

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WANTED: Heath GR-88, 152-174 mcs. L. P. Lastuvks, 1044, 19th St. SE, Cedar Rapids, Ia. 52403.

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WANTED TO BORROW, by student. I.C.S., $99. TV Servicing, repair, course. Joe Wegner, Jr., P. O. Box 262, Glendale, California. 91209.

WANTED: Late model transceiver or receiver. State condx, age and price first letter. V. Schorn, W4RAL, Route, 1, Florence, Al. 35630.

SELL: Wideband Scopes: USM-32 & PACO S-55, $48 Ca. GR type 50-A variac, 115 VAC 45 amps 5KVA, $45. 115 VAC © 75 amps, $7.50. Good binocular microscope, $35. TS-186F, like new, $60. FR4/U, $40. Trammell, 1507 White Oak Ct., Martinsville, Va. 24112.

COLLINS 51J3 rcvr, $450. R. H. Ketcham, W2NLQ, 76H Lloyd Rd., Morganville, N. J. 07751.

BC-610 xmtr in good condx with speech amp., junction box, tuners, coils, cables, manual. $200. S. N. Silbert, White Sulphur Springs, N. Y.

FOR SALE: HQ170C with speaker Exc. condx. $200. FOB WA1CFT, RFD 1, Derry, N. H. 03038.

OSCILLOSCOPE CALIBRATOR, $12.00, Gates Radio Monitor Scope, $35.00. Sensitive mirror galvanometer, $22. Audio Oscillator, Hewlett-Packard Mod. 200CR, 18Hz to 220kHz, $75.00. K2DA, J. Boer, 449 Hill St., Boonton, N. J. 07005.

WANT: DX-35 or like low weight transmitter for 1.8 mHz conversion. Can be minus parts. Need 1.8 mHz xtals. A. Segen, W2BP, 101 Collins, Pleasantville, N. J. 08232.

SALE: Hallicrafters 2000 including power supply 2000, little used, good condition. W4BOJ, P. Gallant, 4411 No. Federal Hwy., Pompano Beach, Florida. 33064. (305) 941-2874.

SALE: 110V AC-110 V DC power supplies, $10 each. Goodman, 5826 S. Western Ave., Chicago, Illinois. 60636.

MOONBOUNCE station W3GKP dismantled. Note new call & QTH: Wm. L. Smith, K4RJ, Rt. 7, Box 315, Franklin, N. C. 28734.

WANTED: WESCOM—TNB-250. FOR SALE: Clegg 22'er. Mint. $150.00. Jim Gysan, W1VYB, 53 Lothrop Street, Beverly, Mass. 01915.

CQ's and QST's for sale, any quantity from one to a hundred. Send your list for quotation. Erv Rasmussen, W6YPM, 164 Lowell St., Redwood City, Calif. 94062.

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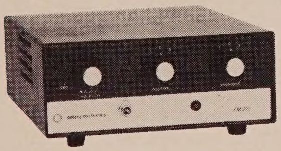
AC400 Power Supply is heavy duty solid state to operate GT-550A at full power, on SSB or CW, and with switch selection of 115/230 VAC, 50/60 Hz input voltages. Order No. 801 Ham Net $99.95



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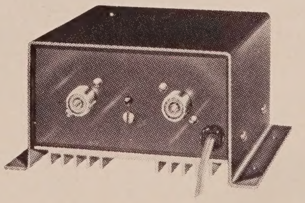

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- VACUUM T/R RELAY is extremely fast, quiet and compact. It closes in milliseconds with a barely audible "tick," handles maximum power with ease.
- CERAMIC-METAL POWER TUBES are rugged and compact. The revolutionary *vapor-cooled* *ALPHA SEVENTY* delivers *uncompromising maximum legal power in all modes.* It runs *whisper-quiet,* thanks to the Eimac 3CV1500A7 shown above and ETO's integram recirculating heat exchanger system. The *ALPHA SEVENTY* is also available with a 3CX1000A7 tube in a thermostat-controlled air cooling system. The two models are otherwise electrically and mechanically identical.

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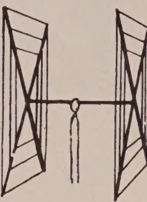

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10/15/20 CUBICAL QUAD SPECIFICATIONS

Antenna Designation: 10/15/20 Quad
Number of Elements: Two. A full wavelength driven element and reflector for each band.
Freq. Covered: 14-14.4 Mc. 21-21.45 Mc. 28-29.7 Mc.
Shipping Weight: 28 lbs. Net Weight: 25 lbs.
Dimensions: About 16′ square.
Power Rating: 5 KW.
Operation Mode: All
SWR: 1.05:1 at resonance
Gain: 8.1 db. over isotropic
F/B Ratio: A minimum of 17 db. F/B
Boom: 10′ long x 1¼″ O.D.: 18 gauge steel; double plated; gold color
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Radiator Terminals: Cinch-Jones two-terminal fittings

Feedline (not furnished); 52 ohm coaxial cable

Now check these startling prices—note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD	$37.00
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TWENTY METER CUBICAL QUAD	27.00
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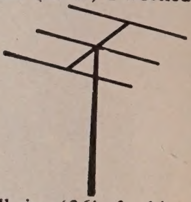
The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9-ADQ, and 4U1ITU THAT ANTENNA WORKS! WN4DYN Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history!



Each beam is brand new; full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞″ and 1″ alumnium alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

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4 EL 6	20
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12 EL 2	27*

***20' Boom**

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"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2-ODH, WA3DJT, WB2FCB, W2YHH, VE3-FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3-KT. Moral: It's the antenna that counts! *FLASH!* Switched to 15 c.w. and worked KZ5-IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5-CLK. OZ4H. and over a thousand other stations!

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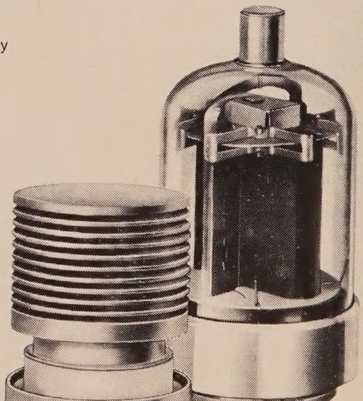

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